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## This Week

International Harvester has brought out a new line of trucks that are described on page 488.

The German Truck Show in Berlin displayed a considerable number of models that are adaptable for either gasoline or other forms of fuel developed as substitutes. See page 492.

A new thought on engine design is presented on page 498.

A description of the Timken laboratory on page 500 is not only interesting but instructive.

On pages 505 and 506 there are more of those mechanical drawings—this time of the IHC newly introduced truck engine.

## Production Tops Last Year

**Car Output for March Estimated at Half-Million In Spite of a Loss of 120,000 Units from Strikes**

By Harold E. Gronseth

The automobile industry will finish the first quarter of 1937 with an output gain of about 15 per cent over the corresponding period of 1936 despite incessant labor troubles that have interrupted operations. With only three days left to go, it appears that the quarter just ending will show total production of around 1,286,000 cars and trucks compared with 1,117,172 in the corresponding period last year.

Indications are that March will account for approximately 500,000 vehicles, well in excess of the 438,992 units built in March last year. February production is estimated at 387,000

units and in January the total was 399,406.

If current strikes can be settled soon and the industry be permitted to go through April unhampered by labor troubles, there is strong likelihood that output will cross the 600,000 unit mark next month although it has one less working day than March. That mark would have been reached this month but for the strikes which already have lifted more than 98,000 units from the March total and will account for an additional 20,000-unit loss before the month is out. For two days last week, four companies were out of production because of strikes. In addition to Chrysler, Hudson and Reo, which are directly involved, Willys-Overland was forced to close Thursday and Friday when the truckers' strike interrupted material shipments.

Both retail sales and condition of dealers' stocks warrant capacity operations by the industry in April. Spring buying is getting under way on a big scale. From indications in preliminary reports on deliveries, it is not improbable that the retail market this month absorbed more vehicles than were built for domestic consumption, which means a further reduction in overall field stocks. Passenger car deliveries stand a good chance of topping the 400,000 mark while truck sales may set a new monthly record of more than 70,000 units. The indicated gain in retail sales of both cars and trucks over the February volume is better than 75 per cent. A year ago, when March sales rebounded so sharply from the February slump, the increase was about 80 per cent, but there was no such drop in February sales this year. Deliveries were up about 20 per cent over February, 1936.

Willys-Overland resumed operation March 22 after a two-day shutdown due to shortage of parts caused by the strike of truck operators in service on lines between Detroit and Toledo. David R. Wilson, president, said that

## Unions Aim to Dominate Michigan

**Speakers at Detroit Mass Meeting Urge Formation of Labor Party with Half-Million Members in State**

In what was intended as a great demonstration of union labor's growing strength in traditionally open shop Detroit, workers trooped into Cadillac Square late Tuesday afternoon.

After first refusing the United Automobile Workers union permission to stage the mass meeting near the City Hall, the Detroit city council yielded to the pressure of union leaders and granted the request when Mayor Couzens approved a modified plan. Permission was given to hold the demonstration at 5:45 p. m. Tuesday instead of at five o'clock as originally requested, and instead of using the City Hall steps for a rostrum, the meeting place was moved to the east end of Cadillac Square.

The crowd began assembling at 4 o'clock and before the time scheduled to begin the meeting, the spacious square was jammed with union members and spectators. Estimates of the size of the crowd ranged all the way from 12,000 to 100,000. Police Commissioner Pickert estimated 37,000. Elaborate preparations had been made by police to handle the throng. More than

1000 extra police were on duty. Employers and occupants of downtown office buildings had been asked by police to evacuate them at 3:30 p. m. to avoid congestion in the downtown district during the rush hour traffic. However, many of these office workers swarmed into the street and joined the assembly. Speaking got under way fully 15 minutes ahead of schedule and in less than an hour and a half the meeting was over. The crowd dispersed in orderly fashion.

Speakers were UAW President Homer Martin, Vice-Presidents Ed. Hall and Richard Frankenstein, Frank X. Martel, president of the Detroit and Wayne County Federation of Labor and Leo Krzycki, CIO representative.

The meeting was called primarily to protest the eviction of sitdown strikers by the police. The mayor and police commissioner were booted whenever their names were mentioned, as was also reference to the Supreme Court justices. "We know nine old men who have been on a sitdown strike for six

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## Truce Frees Chrysler Plants

### Agreement Reached by Chrysler and Lewis Confirmed by Vote of Sitters; Parleys Resume on Bargaining Question

Agreement to evacuate the eight Chrysler plants occupied by 6000 sit-down strikers for 17 days was reached March 24 in a conference between Walter P. Chrysler, chairman of the corporation, and John L. Lewis, chairman of the Committee for Industrial Organization. The conference had been arranged by Gov. Frank Murphy, who announced the evacuation terms in a letter to the union after the agreement had been reached.

In return for Mr. Lewis's promise to order the men out of the plants, Mr. Chrysler agreed not to try to resume production in them or to remove any dies, machinery or equipment to other plants during the collective bargaining negotiations. The agreement also provided that following withdrawal of the strikers, executive staffs, plant officials, maintenance men, engineers, janitors, clerks, and similarly employed persons should have access to the factories.

The agreement was announced at 8:45 p. m. after a meeting in the governor's office at Lansing Mich., that had lasted over eight hours. Besides Mr. Chrysler, Mr. Lewis and the governor, lawyers and associates for both sides attended the conference.

Following the truce, the United Automobile Workers' Union leaders rushed back to Detroit and spent the entire night calling up strikers in the various Chrysler plants. After having heard their leaders explain the terms of the agreement, the sitdowners voted on the question of evacuation. Balloting started at the DeSoto plant about 1 a. m. and was not completed in the last plant until noon Thursday.

Strikers at the eight plants voted unanimously to leave but spent so much time in balloting that John L. Lewis issued a speed-up order. Lewis was waiting in Lansing to resume negotiations with W. P. Chrysler on the main issue of sole bargaining rights as soon as the plants were evacuated.

First to leave were strikers in the Dodge main plant where shortly before noon the men marched out four abreast behind a band. Sitdowners continued pouring out of other plants until late afternoon. State Commissioner of Public Safety Oscar A. Olander posted guards of state police at plant gates. Company officials and maintenance men began moving in.

Having completed their all night task and assured that the plants were cleared of men, union leaders chartered a bus and returned to Lansing for resumption of the conference there.

Burglary charges were hurled at the union by Chrysler officials Monday when UAW leaders produced photostatic copies of what they claimed was "irrefutable proof that the Chrysler Corp. not only carried into execution a very systematic espionage system, but

that they also listed for non-rehiring men whose only crime was being active in the union."

### Firestone Tie-Up Continues, Other Akron Plants Normal

The United Rubber Workers' Union siege of the Firestone Tire & Rubber Co. factories in Akron has swung into its fourth week, with no indication of any break in the existing deadlock. There have been no negotiations since company spokesmen March 10 turned down the URW demand for recognition as the sole collective bargaining agency for all Firestone workers. Ten thousand employees are idle. Head officials of the company still are in Florida. Employees and officers are operating from temporary offices in downtown Akron office buildings, and in their homes.

Eighty Akron and Summit County unions have pledged support to the URW and the CIO for a mass demonstration of organized labor's strength in Akron April 4. Elaborate preparations are being made for the event.

Firestone is prepared, it is reported, to resist a protracted siege. While the company has ample stocks of tires for replacement purposes, it does not, it is understood, have any heavy reserve of original equipment tires. Chrysler and Hudson original equipment orders suspended it is considered probable that other tire manufacturers will help supply the normal Firestone requirements which go principally to the Ford Motor Co.

All other Akron factories continue to operate normally. The handling of the Firestone strike is in marked contrast to the events of a year ago during the six weeks' Goodyear strike. Firestone is making no attempt to enter its offices. It is not negotiating with the union. There is no talk of a "Law and Order League" such as was formed a year ago, according to testimony recently submitted to the LaFollette hearing in Washington. Testimony at that hearing indicates that Goodyear gave \$15,000 to this league in an effort to break the strike.

### French Automotive Engineers Entertained at German Plants

More than 100 members of the French Society of Automobile Engineers visited the Berlin automobile show and afterwards went through the Opel, Mercedes-Benz and Bosch factories. The French engineers were officially received at the city halls of Berlin and Frankfort and they were entertained at dinner and luncheon by the Bosch company at Stuttgart and

by the Mercedes-Benz company at Unterturkheim. This was the first foreign excursion of the French society, but in view of its success others are likely to be organized.

### UAW Prepares Drive on Tool and Die Industry

Plans of the United Automobile Workers Union to make demands in the tool and die industry were prematurely disclosed by a union representative during the past week. It was stated that letters were being sent to all employers listing demands that had been drawn up in a meeting of tool and die makers a week ago and asking for a conference. Later, the union headquarters stated the announcement was premature and incorrect. The industry employs about 25,000 workers, 80 per cent of whom the UAW claims as members. Demands are understood to call for higher minimum wage rates; sole recognition; control of the number of apprentices; eight-hour day and 40-hour week with time and a half for overtime, and 10 cents an hour extra for night shifts.

### Reo Negotiations Begin

Officials of the Reo Motor Car Co. and UAW representatives accepted the invitation of Mayor Max A. Templeton, of Lansing, to negotiate differences at a conference in his office with the mayor acting as mediator. The plant has been held by sitdown strikers since March 10. Negotiations began March 22.

### Wilson Foundry Reorganized

The Wilson Foundry & Machine Co., Pontiac, Mich., formerly a subsidiary of Willys-Overland Motors, Inc., has been reorganized as an independent concern with Charles E. Wilson as president. Mr. Wilson is the son of D. R. Wilson, former president, who will now devote all of his time to Willys-Overland.

### Unions Now Aim to Dominate Michigan

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years," said Mr. Martin. The crowd cheered mention of President Roosevelt, Governor Murphy and John L. Lewis.

Four resolutions were passed by acclamation. The first asked for establishment of a powerful militant union to obtain "solidarity and unionism of spirit." Another voted support to Lewis and union members on strike in Chrysler plants. A third resolution condemned Mayor Couzens and Commissioner Pickert for eviction and clubbing of sitdown strikers and served notice that a repetition of these tactics will cause a recall movement to be instituted against the mayor. Chairman Hall offered the last resolution suggest-

ing for every eviction there be two sit-down strikes.

Speakers urged the gathering to prepare to vote as members of a labor party in order to secure a "Wagner Act for Michigan" and City Hall officials agreeable to unionization of Detroit. Martin predicted labor in Michigan would be able to muster 500,000 votes at the next election.

"After the next election," said Martel, "we will have a Police Commissioner who will put human rights above property rights."

#### General Strike Threatened

The United Automobile Workers' Union had threatened to call a general strike in Detroit if police persisted in their belated action to clear plants and business establishments of sitdown strikers.

City authorities were inclined to scout the idea of a general strike. Said Mayor Couzens: "I don't believe Mr. Martin would be so unwise as to call out on a general strike men who have just been through six years of suffering due to depression and loss of work."

A new sitdown strike at the Ferro Stamping Co. was settled Wednesday. The employees had been on strike three weeks in February but returned on an agreement which called for further negotiations. They sat down again Wednesday in protest against the way negotiations were proceeding. Operations were resumed again Thursday morning.

The National Smelting & Refining Co. has filed a petition for an injunction against 17 sitdown strikers who have been occupying its plant since March 14. Circuit Judge Adolph F. Marschner issued an order to show cause why the injunction should not be granted. The company contends that only two employees were in the plant when the strike was called and that the other 15 gained entrance illegally after the doors were locked.

The second General Motors strike since its settlement with the union occurred late Wednesday when 300 workers in the sheet metal department of Cadillac sat down because of transfer of a workman from the sheet metal department and his replacement by a new man. The strike was settled in three hours and the workers returned to their jobs. The grievance was taken up with the management by the department's committee, according to the terms of the UAW agreement. A meeting between the committee and management was scheduled for three o'clock but the men sat down at 2:30. Other departments were not affected.

Boydell Bros., paint and varnish firm, locked out 35 workers Wednesday to avert a strike.

Police encountered some difficulty in ejecting strikers from the Bernard Schwartz Cigar Co. plant, occupied since Feb. 18 by approximately 100 men and women sitdowners. Seven persons were hurt in the battle. The raid was personally directed by Mayor

Couzens and Police Commissioner Pickert.

Two more raids were made by police Monday on sitdowners who offered no resistance. Strikers peaceably evacuated the plant of the Henry Printing Co., the 25 occupants filing out in orderly fashion when police appeared. The 19 men, women and children who had taken over a welfare station were also moved out without opposition.

The Chris Craft Corp.'s boat works at Algonac, Mich., was closed by a strike March 20 when 150 pickets blockaded the gates. The plant employs about 600 men and women. Company officials announced that the plant would be closed indefinitely unless strike rumors ceased. UAW recruiting headquarters have been opened in a hotel. The union organizers said that seven demands would be submitted to the management, including a 15-day truce for negotiations;

preservation of seniority rights; minimum wage rate; eight-hour day and 40-hour week, with time and a half for overtime; abolition of favoritism and discrimination; improvement of working conditions; and rehiring of all men dismissed last week. About 125 employes had been laid off because of temporary curtailment of production, but most of these were recalled and capacity operations were to have been resumed at once, according to officials.

The W. E. Warner and Co. foundry in the same city was closed by the management as a precaution and will remain shut indefinitely.

At Yale, Mich., the deputy sheriff served an injunction prohibiting picketing of the Yale Woolen Mills. A union official said that no attempt would be made to end the lockout until the strike in Chrysler plants which use Yale products is settled.

## Germany Dreams of a "Popular" Car

*But Production of \$400 Model for the Masses Not Likely to Be Realized for Some Time, Say Experts*

By W. F. Bradley

Wide publicity has been given to the appearance of a popular German car, selling at 1000 marks or less (approximately \$400). The information was spread that this car would make its appearance at the Berlin show, and that 1,000,000 would be put into production, for Germany was determined to have the same ratio of cars to inhabitants as the United States. The publicity department at the Berlin show made the definite statement that the popular car

"Volkswagen" Designer



Dr. Ferdinand Porsche, famed for his racing models, has drawn up plans for a low-priced car which Germans hope will bring motoring to the masses

would be on the market by next January and that it would sell for 995 marks.

Inquiries in various engineering circles in Germany have demonstrated that these statements were far too optimistic. The German "volkswagen" has been designed by Dr. Ferdinand Porsche, a consulting engineer with offices at Stuttgart. The car has a four-cylinder air-cooled engine mounted at the rear and driving the rear wheels. All wheels are independently sprung. Only one type of body will be produced, this being a 4-5 passenger sedan. Weight of the car complete with spare wheel is 1320 lb.

Three cars have been built in Dr. Porsche's private shops and each has covered 30,000 mi. under strenuous test conditions. Another lot of 30 cars has just gone through the Mercedes-Benz factory and will be submitted to rigid road tests. No definite plans have yet been made for the production of the car. (Turn to page 507, please)

#### Anti-Sitdown Bills Pushed In Michigan Legislature

New bills dealing with the sitdown menace have been introduced in the Michigan State Legislature. Senator D. Hale Brake introduced a measure which would make it unlawful for any person to negotiate with a union so long as strikers were occupying a plant illegally. Senator William Palmer of Flint introduced two bills, one providing for compulsory bargaining between employer and employee, and another which would make it a felony to "enter upon or take possession or control of any property, real or personal, and to withhold same from or interfere with free and unimpeded use thereof by the owner or other persons having the right to possession or use thereof against the will of such owner or other person."

# Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for AUTOMOTIVE INDUSTRIES

There was a moderate decline in general business activity last week, which was mostly the result of the decline in activity in the automobile industry because of labor difficulties. The weekly business index, compiled by the Journal of Commerce, stood at 102.6, as against 103.7 the week before and 93.3 a year ago.

#### Carloadings Higher

Railway freight loadings during the week ended March 13 amounted to 748,993 cars, which marks a gain of 14,866 cars above those in the preceding week, a rise of 132,056 cars above those a year ago, and an increase of 151,562 cars above those two years ago.

#### Small Decline in Food Prices

According to the Bureau of Labor Statistics, retail food prices during the five weeks ended Feb. 16 declined 0.1 per cent. Forty-six items in the Bureau's compilation increased, while 31 declined and seven remained unchanged.

#### Chain Store Sales Gain

Sales of 28 store chains, including two mail order houses, during February were 11.2 per cent above those in the corresponding month last year. Sales of the 26 store chains alone showed an increase of about 7.8 per cent.

#### Power Output Sharply Higher

Production of electricity by the electric light and power industry in the United States during the week ended March 13

was 16.9 per cent above that in the corresponding period last year.

#### Building Contracts Up 22%

Construction work started in 37 eastern States during February was about one-third larger than that a year ago, according to the F. W. Dodge Corp. The figure for construction started in the first two months of this year was 22 per cent above that for the corresponding period last year.

#### Lumber Production Steady

Lumber production during the week ended March 6 was 59 per cent of the 1929 weekly average. Shipments and production made a good showing, although they were slightly below the levels in the preceding week.

#### Fisher's Index

Professor Fisher's index of wholesale commodity prices during the week ended March 20 stood at 93.7, as compared with 92.9 the week before and 91.1 two weeks before.

#### Federal Reserve Statement

The consolidated statement of the Federal Reserve banks for the week ended March 17 showed a decline of \$1,000,000 in holdings of discounted bills. Bills bought in the open market and Government securities remained unchanged. Money in circulation increased \$9,000,000, and the monetary gold stock rose \$31,000,000.

## Germans Will Try for World Record Next Year

Germany will attack the world's land speed records at present held by Sir Malcolm Campbell, during the summer of 1938. A car for this purpose is now being designed by Dr. Ferdinand Porsche, the engineer responsible for the Auto Union racing cars.

The German record breaker will be completed before the end of the present year and will undergo preliminary trials on one of the new German motor roads. The record runs, however, will be made on the Bonneville Salt Flats in 1938.

All details regarding the car are being kept secret. All that Dr. Porsche would reveal to a representative of AUTOMOTIVE INDUSTRIES was that the car would be much smaller and lighter than the Rolls Royce job used by Campbell.

## Three Italian Cars at Roosevelt Course July 5

Three Alfa Romeo cars, one of which will be driven by Nuvolari and the two others probably by Brivio and Farina, will be sent to the Roosevelt

Raceway for the Vanderbilt Cup race on July 5. French drivers are protesting the change of date from September to July, claiming that this change is contrary to international regulations. French drivers will have to choose between their own Grand Prix and the American race. Both Mercedes and Auto Union claim that the new date makes it impossible for them to race in America.

The Ferrari racing organization has announced that Nuvolari will not be sent to Indianapolis.

## Jan. Tractor Exports

### 90% Above Last Year

More than 72 per cent of the total farm equipment exported during January consisted of tractors and parts, shipments of which were valued at \$2,907,105, a 90 per cent increase over the January, 1936, shipments valued at \$1,532,435, according to the machinery division of the Bureau of Foreign and Domestic Commerce.

Foreign sales of tractors during last January consisted almost equally of the wheel and track types. Shipments of the track-type tractors, however, amounting to \$1,149,191, represented

a gain of 214 per cent over the exports a year ago valued at \$366,000, while the foreign sales of the wheel-type tractors valued at \$1,139,189 were 61 per cent above similar shipments in 1936 valued at \$727,901.

Slightly more than half of the track-type tractor exports consisted of the fuel injection type engines, compared with the carburetor type, as in January, 1936. Similarly, most of the shipments of the carburetor type were of the sizes under 35 drawbar hp., and of the fuel injection type of sizes above 35 drawbar hp. A large majority of the wheel tractors exported during the month were of the sizes above 14 belt hp.

## Cutting Fluids Committee to Cooperate on Metals Handbook

The Independent Research Committee on Cutting Fluids (AUTOMOTIVE INDUSTRIES, Dec. 19, 1936, page 842) has accepted the invitation of the American Society for Metals to serve on the National Metals Handbook Committee, according to a statement by Joseph Geschelin, chairman of the committee.

## Outboard Engine Exports Higher

Exports of detachable outboard engines from the United States in 1936 totaled 6562 units valued at \$426,317, compared with 4840 units valued at \$328,312 in 1935, according to the Automotive-Aeronautics Trade Division, Bureau of Foreign and Domestic Commerce.

## 40 Years Ago

with the ancestors of AUTOMOTIVE INDUSTRIES

### Motor Cabs in New York

The metropolitan newspapers have had a great deal to say lately about the electric hansom which the Electric Carriage & Wagon Co. are now plying for hire in New York City. About a dozen of these cabs are now in regular service, no difficulty having been experienced in procuring the necessary license from the Board of Aldermen. Many of the chaperones and men-about-town are availing themselves of the opportunity to try the sensations of riding in a horseless vehicle.

Even aristocracy has been bold enough to overcome convention and step into the horseless cab. A scion of one of the wealthiest families took his bride to ride in one of them the other day as an incidental diversion of their honeymoon.

Some of the views expressed are decidedly narrow and prejudiced, as is universally true when any new idea is presented for public approval, but that the judgment of the people is in the main favorable is proved by the statement of the company that the cabs are in almost constant demand and that more will be put in service soon.—From *The Horseless Age*, March, 1897.

# Automotive Metal Markets

## Steel Mills Reach Capacity Operations as Consumers Press for Immediate Deliveries

By William Crawford Hirsch

Steel finishing mills are operating at virtual capacity, principally with a view to rushing to completion low price orders remaining on their books. The preponderant tonnage of these backlog is due to the automobile manufacturers and parts makers. Instances of further "hold" orders, prompted by sit-down strikes, are offset by eagerness on the part of other automotive consumers to obtain possession of all steel coming to them on old commitments.

The change from the first to the second quarter of the year is accompanied by a radical transformation in the market set-up. Heretofore, preceding the going into effect of a price advance, buyers were afforded an opportunity to cover at least part of their requirements in the following quarter at old prices. As a result, the steel mills enjoyed the protection of good-sized backlog while price advances were on trial. With the recent announcement of sharply higher prices there was also wiped out the twilight period in which buyers had a chance

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pay certain obligations and purchase additional equipment and working capital.

### French Grand Prix at Linas-Montlhéry July 4

An invitation by the Automobile Club of France has been extended to American motor car manufacturers through the Contest Board of the American Automobile Association to par-

icipate in the 31st Annual Grand Prix of France to be held on the Linas-Montlhéry 12 Km. road circuit near Paris on July 4, 1937. The race is over a total distance of approximately 312 mi. and is limited to cars of the "sport category" which must comply in general respects with regularly catalogued models.

Although considerable freedom is allowed with regard to the design of the internal component parts of the engine, a reasonable weight requirement will be enforced in proportion to the engine size. Fuel for all cars is to be furnished by the sponsors of the race and will have an octane coefficient of 81. A minimum qualifying speed of 75 m. p. h. for one lap of the course is made a requisite to starting.

## 3 Months' Registrations Up 23.8%

### New Passenger Car Registrations

	January 1937	December 1936	January 1936	Per Cent Change January 1937 over 1936	Per Cent of Total January		Three Months		
					1937	1936	1937 Models	1936 Models	Per Cent Change
Ford	67,166	63,367	50,744	+ 32.4	23.94	23.52	158,227	161,916	- 2.1
Chevrolet	56,122	60,552	62,998	- 10.9	20.00	20.20	199,768	184,163	+ 8.4
Plymouth	43,420	46,677	29,922	+ 45.0	15.47	13.87	132,523	92,774	+ 43.0
Dodge	21,963	23,733	15,240	+ 44.0	7.63	7.06	64,201	48,116	+ 33.5
Pontiac	16,189	19,405	9,377	- 16.6	5.77	4.35	48,288	31,797	+ 52.0
Buick	15,205	21,485	9,168	+ 68.0	5.42	4.25	52,890	34,072	+ 55.5
Oldsmobile	15,193	19,727	11,552	+ 31.6	5.41	5.35	39,511	39,120	+ 1.1
Terraplane	7,019	8,197	4,681	+ 50.6	2.50	2.16	20,597	14,660	+ 40.7
Packard	6,562	7,529	3,030	+ 116.5	2.34	1.40	21,054	11,683	+ 80.0
Chrysler	6,543	7,512	3,666	+ 78.3	2.33	1.70	18,564	8,346	+ 128.0
De Soto	5,073	5,824	2,325	+ 118.5	1.81	1.08	14,238	6,084	+ 134.0
Studebaker	4,923	6,564	3,943	+ 24.9	1.76	1.83	17,222	9,909	+ 74.0
Nash	4,581	5,051	2,595	+ 76.8	1.83	1.20	12,983	7,869	+ 65.0
Willys	2,573	1,126	707	+ 264.0	.93	.33	4,255	2,918	+ 46.0
La Salle	2,224	3,039	714	+ 211.5	.79	.33	6,898	2,906	+ 130.0
Lincoln	1,774	2,067	801	+ 121.5	.63	.37	5,537	1,773	+ 212.0
Hudson	1,527	1,913	1,752	- 13.0	.56	.81	4,893	5,920	- 17.5
Cadillac	1,151	1,385	856	+ 34.4	.41	.40	3,504	3,041	+ 15.0
Graham	967	1,468	992	+ 5.3	.34	.41	3,505	2,724	+ 28.5
Cord	97	87			.03		235		
Auburn	40	52	201	- 81.0	.01	.00	175	709	- 76.3
Pierce-Arrow	38	46	56	- 32.1	.01	.03	138	200	- 33.6
Miscellaneous	265	697	580	- 54.3	.00	.26	1,870	2,530	- 26.0
Total	280,615	327,303	215,782	+ 30.3	100.00	100.00	831,478	673,236	+ 23.8
Chrysler Motors	76,959	83,546	51,153	+ 50.2	27.44	23.71	230,126	155,320	+ 48.1
Ford and Lincoln	68,940	65,434	51,545	+ 34.0	24.57	23.89	163,764	163,889	None
General Motors	106,064	145,593	94,667	+ 12.0	37.00	43.87	350,657	295,099	+ 19.0
All Others	26,592	32,730	18,417	+ 55.2	10.19	8.53	86,931	59,130	+ 47.0

### New Truck Registrations

	January 1937	December 1936	January 1936	Per Cent Change January 1937 over 1936	Per Cent of Total January	
					1937	1936
Ford	16,544	11,897	14,006	+ 13.3	34.75	33.39
Chevrolet	14,362	14,811	15,124	- 5.0	30.17	34.56
International	6,244	5,048	4,743	+ 31.7	13.12	10.84
Dodge	3,764	4,418	6,207	- 39.3	7.91	14.18
G. M. C.	2,820	1,793	428	+ 560.0	5.92	.98
Diamond T	963	765	495	+ 74.3	1.81	1.13
White	479	426	409	+ 17.0	1.01	.93
Mack	389	431	90	+ 332.5	.82	.21
Reo	354	296	330	+ 4.6	.74	.77
Terraplane	225	169	59	+ 383.0	.60	.13
Plymouth	216	42	193	+ 12.0	.45	.44
Federal	207	234	223	- 7.0	.43	.51
Studebaker	169	216	143	+ 18.1	.35	.33
Autocar	130	165	75	+ 73.3	.27	.17
Willys-Overland	125	144	178	- 29.8	.26	.41
Indiana	113	145	84	+ 34.8	.24	.19
Brockway	102	105	94	+ 8.5	.21	.21
Stewart	92	86	85	+ 8.1	.19	.19
Divco	80	53	53	+ 51.0	.17	.12
Stutz Pak-Age Car	72				.15	
F. W. D.	42	50	19	+ 121.0	.09	.04
Sterling	29	30	8	+ 262.0	.06	.02
Kenworth	8				.02	
Schacht	6				.01	
Miscellaneous	114	204	105	+ 8.2	.25	.25
Total	47,609	42,200	43,760	+ 9.0	100.00	100.00

# Washington Studies Sitdown Action

**President to Confer with Legislators on Situation;  
Lewis Reported Alarmed by Sitdown Spread**

By L. W. Moffett

What federal legislation, if any, could be enacted to bring an end to the sitdown strike situation?

This is the question that has arisen in Washington on the heels of the announcement by President Roosevelt at Warm Springs, Ga., Wednesday that he had called a conference with Congressional leaders on Saturday upon his return to Washington to deal with the sitdown strike situation.

One suggestion was that it will propose federal action through intervention upon invitation of state authorities. However, the Administration has constantly made vain efforts in this direction through conciliators from the Department of Labor. On the other hand, it has been pointed out, it is doubted that federal legislation of a compulsory nature could be enacted constitutionally if the sitdown strike is to be considered wholly a state matter. There are also those who contend there is enough law already on the statute books to handle the sitdown strike.

The difficulty, so it is contended, is not insufficient law, but lack of enforcement. Attempts to evict sitdown strikers through the injunctive process have met with open defiance at the hands of strikers and their Committee for Industrial Organization colleagues. Some have sought to develop the distinction that a law, supported by the President, might solve or at least mitigate to a large degree the sitdown strike situation inasmuch as the President has strong organized labor support and might be willing to follow his leadership.

Congressional leaders plainly are much disturbed over the situation. This was indicated by a statement of Senator Robinson, majority leader, who declared that "It appears that a crisis is approaching, is near at hand." He and Speaker Bankhead of the House of Representatives undoubtedly will be among the leaders in the Congressional delegation who will confer with the President at the White House. It is expected Department of Labor officials and probably officials from other executive branches will also participate in the conference.

There is another phase of the situation that has had little, if any, publicity and it concerns the CIO leaders. It is becoming a matter of increasing comment that Mr. Lewis himself, despite outward pretensions, is alarmed over the sitdown strike. The contention is made that this unlawful demonstration by massed labor was never the child of Lewis's mind, but rather that it grew up quickly without his having anything to do with it and has gotten out of his hands. Lewis is said to see in it the real prospect that unless it is controlled

he will see the CIO leadership taken abruptly from him and seized by the most radical elements of the country. For this reason, it is believed, Lewis would gladly welcome—if he has not quietly encouraged—Presidential interference to end the sitdown strike.

## Chevrolet Plans Building New Engine, Axle Plant in Buffalo

Plans for the construction of a new engine and axle plant to be placed in operation at Buffalo by the first of next year were announced this week by M. E. Coyle, general manager of the Chevrolet Division of General Motors Corp.

The plant, comprising nearly 1,000,000 sq. ft. of floor space, will be able to manufacture approximately 1200 engines a day, and the same number of axles, Mr. Coyle declared. It will add between 3000 and 4000 workers to Chevrolet's payroll in Buffalo, and will increase the wage payments made by the company in Buffalo an approximate \$6,400,000 annually.

The new building will be constructed of brick and steel, one story high, and with a two-story administration building at the front. The plant will cover 157 acres of ground along Buffalo's waterfront, with a 700-ft. frontage on the Niagara River. The plans call for the new buildings being roofed over by fall, with actual operations starting some time around Jan. 1, 1938.



**VINCENT P. RUMELY**, well known in the production field of the automotive industry, has resigned from the Hudson Motor Car Co. to take an executive position in the manufacturing division of the Crane Co., Chicago. Mr. Rumely had been with Hudson since 1916 and at the time of his resignation was division superintendent. He has been active in the SAE, both nationally and in the Detroit section. He is at present chairman of the Detroit Section SAE and will complete his term which expires with the close of the 1936-1937 season.

**HERMAN L. WECKLER**, vice-president and general manager of the De Soto division of Chrysler Corp., has been appointed Chrysler vice-president in charge of industrial relations.

**H. BERTRAM LEWIS**, sales and advertising counsel, will move his office, April 1, from 100 East Forty-second Street to the Lincoln Building, 60 East Forty-second Street, New York.

**NELSON A. BEARDSLEY** has been appointed general sales manager of Willys-

Overland Motors, Inc. Mr. Beardsley comes to Willys-Overland from the Commercial Credit Co., Baltimore, where he has been for the past three and one-half year vice-president, specializing in field force organization. Previous to this he was for 17 years with the Willys-Overland company.

**CLAYTON W. BUTTERFIELD** has been appointed advertising manager of the Benda Products Corp. Mr. Butterfield, who was formerly in charge of the sales program of the brake and lining division of the Benda organization, will continue this work in addition to his duties as advertising manager.

**L. A. MILLER**, formerly president of Willy-Overland, has been elected vice-president of Graham-Paige Motors Corp., and has assumed full charge of domestic sales, merchandising and service.

**D. R. DONALDSON**, for the past two years factory manager of the Covered Wagon Co., trailer coach manufacturers, has been promoted vice-president in charge of manufacturing. Prior to joining Covered Wagon, Mr. Donaldson was general superintendent with the Murray Corp. and before that was factory manager of the Briggs Mfg. Co.

**CHARLES MORTON LOMAX**, managing director of Chrysler Motors, Ltd., and Dodge Brothers, Ltd. (both of Great Britain), has tendered his resignation to the boards of both companies. Mr. Lomax was with Chrysler since 1919 and Dodge since 1928. He has made several trips to the U. S.

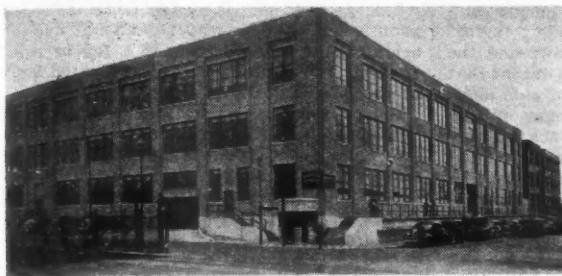
## Hudson's Earnings Up

**Net Equals \$2.14 per Share;  
Other Companies Gain**

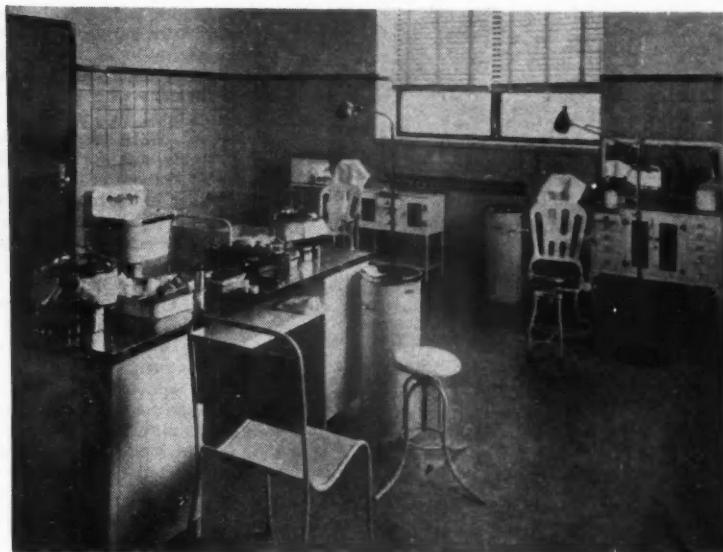
The Hudson Motor Car Co. reports that consolidated net earnings in 1936, after all charges including interest, depreciation and all taxes, were \$3,305,616 as compared with \$584,749 in 1935. The 1936 net earnings were equivalent to \$2.14 per share on outstanding common stock.

In commenting upon the company's progress, A. E. Barit, president and general manager, states that Hudson and Terraplane shipments in 1936 totaled 123,266 cars, a gain of 21.9 per cent over shipments in 1935. This gain of 21.9 per cent compares with an increase of 12.4 per cent in shipments for the motor industry as a whole. The company's shipments in 1936 were the largest for any year of the last seven. Shipments in the first two months of 1937 are stated to show a gain of 48 per cent over the corresponding period of 1936.

The consolidated balance sheet of the Hudson Motor Car Co. and subsidiaries as of Dec. 31, 1936, shows current assets of \$22,178,697 as compared with current liabilities of \$9,794,183, a ratio of 2.2 to 1. Cash and Government bond holdings amount to \$12,036,793, a gain of \$2,452,787 during the year. Net working capital at the close of the year amounted to \$12,384,514, an increase of \$2,417,853 during 1936. The report points out that this increase in working capital was achieved despite the fact that during the year the company applied \$1,250,000 to the retirement of



The first building to be completed in the Buick construction program houses the personnel, employment, master mechanics, works engineering and metallurgical departments. It also contains a modern 15-room factory hospital, one room of which is shown at right.



its funded debt, \$1,000,000 of which was retired voluntarily in advance of maturity.

The company reports that its products are currently being sold by more than 4700 distributors and dealers throughout the world.

#### Packard Earns 47 Cents a Share

Packard Motor Car Co. reports for the year 1936 a net profit after depreciation and reserves for taxes of \$7,053,220, amounting to 47 cents a share on the 15,000,000 outstanding no par common shares, compared with \$3,315,622 (22 cents a share) in 1935.

"The year just closed was one of noteworthy progress for the company," says Alvan Macauley, president, in his annual report to stockholders. "We carried on our program of expansion in accordance with plans laid more than three years ago."

Packard dealers in the United States and Canada number 35 per cent more than a year ago, Mr. Macauley states. The company produced 54.4 per cent more cars in 1936 than in 1935, and during the last five months of 1936 its volume averaged 75 per cent higher. Present schedules call for production of more than 600 cars a day. The number of Packard employees has increased steadily and totaled 13,112 at the factory as the year ended.

Factory sales for 1936 totaled \$73,052,859, with cost of sales amounting to \$60,719,174, leaving a gross profit of \$12,333,685, compared with \$7,404,251 for 1935. Net profit from factory operations was \$6,286,810, against \$2,925,453 for 1935, and net profit from operations of branches and subsidiaries of \$766,410, against \$390,169. The balance sheet showed cash and investments at the end of the year at \$14,357,664, compared with \$12,986,236 at the end of 1935 and current assets at \$29,791,620, against \$24,851,151.

#### Canadian Ford Profits Higher

Showing a marked increase over the preceding year, the Ford Motor Co. of Canada, Ltd., earned a net profit for 1936, after all charges, of \$3,358,469.97. The net profit was the highest since

1929, and compared with a net profit of \$1,939,204.25 for 1935. Earnings were at the rate of \$2.02 per share, compared with \$1.17 in 1935. The stock is now on a dividend basis of 25 cents per quarter, equivalent to a \$1 per year.

Net operating income of the Canadian Ford company, including dividends from subsidiary companies, amounted to \$3,542,371.94, in comparison with \$1,499,887.03 in 1935. Contributing in large measure to profits for the year was the portion of operating profits of overseas subsidiary companies withdrawn in the form of dividends amounting to \$2,517,351.49 before tax. Profit on Canadian operations amounted to \$1,025,020.45.

Net profit of Vauxhall Motors Ltd., controlled by General Motors Corp., for the year ended Dec. 31, 1936 was £301,752 after interest on first mortgage debentures, sinking fund and provision for income tax.

Doehler Die Casting Co. reported net earnings of \$894,139 or \$3.19 a share on the common stock for 1936 compared with \$638,818 or \$2.39 a share in 1935.

## •SLANTS:

**LUCKY USED CAR**—One of the most satisfied used car purchasers in the country is undoubtedly Roy Koontz, of Bloomington, Ind., who recently bought a car from the local Chevrolet dealer. After driving it home he found a dime under a seat cushion. A second glance showed that it was coined in 1821 and, consulting a specialist, he learned that it is so rare as to have a current value of \$450.

**DESIGNS FOR SALE**—Delage, the French automobile manufacturer, is offering for sale a set of drawings for a racing car to fit the 1938-1940 international formula, according to the Contest Board of the American Automobile Association. Engineer Lory, who has designed all the racing Delages since the war, prepared the designs. They are for a 12-cylinder V engine of 183 cu. in. displacement, mounted at the rear with rear drive, independent wheel suspension all around, four or

five speed transmission, low center of gravity, reduced overall height and scientific streamlining. One of M. Lory's racers, a 12-year-old 91½ cu. in. job that "cleaned up every race it was entered in last year" was recently sold in England for \$18,000. The AAA Contest Board adds that it has been informed the new Lory design "is undoubtedly one of the finest in Europe."

**WAGON BY STUDEBAKER**—Reminiscent of horse and buggy days was the transaction that took place recently in a hardware store in Brazil, Ind. A farmer came in and asked for a one-horse wagon. "We have just what you want," replied the clerk, with nonchalance, as he sold the customer a Studebaker wagon that had been in stock for 25 years. Studebaker ceased making wagons shortly before Christmas in 1920.

#### Dr. Reggio, French Engineer, To Pay U. S. Lengthy Visit

Dr. F. C. Reggio will visit the United States early in April for a lengthy stay. Dr. Reggio is head of the laboratory of the Compagnie Lilloise des Moteurs, the French company holding the rights for the construction of Junkers Diesel engines. He has also patented a synchro-mesh gear, rights to which are held by General Motors. Dr. Reggio's address in the United States will be care of Guaranty Trust Co., Fifth Avenue at Forty-fourth Street, New York.

#### Ford Dealer Program Renewed

"Watch the Fun Go By," with Al Pearce and Gang, radio program of the Ford Motor Co. dealers, has been renewed for 13 weeks beginning April 6 and will be given over the CBS coast-to-coast network.

#### IHC Lifts Wages in Canada

All factory workers in the International Harvester Co. of Canada, Ltd., plant at Hamilton, Ont., received an increase of four cents an hour, starting March 15, the second in four months.



The Electroly Co., Inc., New York, has prepared a new catalog which gives data on physical properties, recommendations, and specifications of various alloys for all types of resistance welding equipment, including spot, seam, projection, flash and butt welding.\*

The Travelers Insurance Co., Hartford, Conn., has issued a booklet entitled "You Bet Your Life," which gives a statistical analysis of the 1936 automobile accident record.\*

A bulletin, recently issued by Fairbanks, Morse & Co., Chicago, describes the construction and applications of its model 36 Diesel power units.\*

\* Obtainable from editorial department, AUTOMOTIVE INDUSTRIES. Address Chestnut and 56th Sts., Philadelphia.

## Letters

### to AUTOMOTIVE INDUSTRIES

#### Sales vs. Safety

Usually the incorporation of safety features in cars involves costly changes and, strange as it may seem, may adversely affect the sale of the improved product to a public unable to discriminate between sound design and meretricious claims. Several years ago a major improvement in safety and comfort through the lowering of the center of gravity of an American car (following standard European practice) resulted in lost sales due to propaganda of a rival builder disparaging the improved design. Since a trivial gadget of negligible cost may provide, with the assistance of a sales engineering research staff, a powerful sales appeal, it is small wonder that car design should be dictated by *THE SALES ORGANIZATION*, while the engineer is relegated to the sole role of reducing production costs.

When we observe the unduly high cowls and engine hoods, behind which the driver must stretch his neck for a partial view of the road; the obstructions to road vision and arm signals introduced for no sound reason in the driver's windows; the restricted ceiling heights and door entrance clearance; and then read the extravagant claims made for absent virtues, we are forced to conclude that some makers are following with profit the example of the cigarette magnates in advertising their products.

In considering some of the safety features which to the casual observer appear to be universal in 1937 models, we find that a low center of gravity is cleverly simulated in some brands in which the body is carried high above the axle with the floor line about 20 in. above the road, and yet the road clearance on these high hung jobs is as low as seven in. On the other hand, a low priced job, apparently not engineered by a sales organization, is able to secure a road clearance of 8% in. with a floor carried only 16 in. from the ground, and a medium priced line has achieved a floor line carried only 13 in. from the ground with as high a road clearance as any other 1937 job. Ceiling heights range from 46 to 53 in. with door entrance heights from 41 to 47 in., the lower limits being for the high hung jobs, while the generous clearances are for the low hung cars.

Then there is the problem of spring suspension intimately affecting safety. In 1933 one large producer materially softened the springs front and rear to such an extent that when the cars were parked on a side slope they appeared in imminent danger of tipping over. With the front axle floating under the new soft springs, shimmy naturally resulted. Dubonnet and Sizaire of France were called upon to correct the sales engineered situation. Now, when brakes are applied, our streamlined beauties genuflect to their sponsors, but when the lights change they rear up like Tom Mix's horse.

Headlight glare today is more of a menace than ever. From extended observations a large part of it appears to be from late model cars with high intensity lights pointed up at the oncoming traffic. Some of these offenders have soft spring suspensions and weight distribution such that when the rear seat is loaded the car assumes a decided up tilt at the front end. Thus headlights properly pointed to the road for the unloaded car are pointed upward at the oncoming traffic

when the rear seat is loaded. The driver of such a car wonders why he can not use his bright lights when driving in a fog or rain, for then the uplifted rays are reflected back to the offending driver.

It is of interest to note that Great Britain has issued requirements that a braking system must have safeguards to forestall total failure of all four brakes in the event that a break or leap occurs in the pipe line or pistons of a hydraulic system. It would appear that such a safeguard should be required in this country.

It seems probable that so long as a large part of the buying public may be lured by specious slogans, the efforts of some producers will be directed toward research along the line of appeals to consumers' ignorance rather than to the production of soundly engineered cars.

F. J. CLARKE.

*A letter from Lee Oldfield in which he describes what he considers to be dangerous features of new model cars was published in AUTOMOTIVE INDUSTRIES, Jan. 23, 1937, page 123.*

## Calendar of Coming Events

### SHOWS

Portugal, 11th Automobile Salon, Porto	March 27-April 5
Yugoslavia, 14th Automobile Salon, Zagreb	April 17-26
Illinois Automotive Ass'n, 4th Annual Show and Maintenance Exhibit, Navy Pier, Chicago	Apr. 24-28
Poland, Automobile Salon—16th International Fair, Poznan	May 1-10
Norway, Automobile Salon—Oslo	May 7-10
Second Annual Automobile Maintenance Show, San Francisco	May 20-23
Morocco, Automobile Section, Tangier Fair, Tangier	June
France, Automobile Section, Bordeaux Fair, Bordeaux	June 13-28
Belgium, First International Aero-nautical Salon, Brussels	June 18-30
Fourth ASTM Exhibit of Testing Apparatus and Related Equipment, New York	June 28-July 2
Poland, Automobile Salon (Foire Orientale), Lwow	Sept. 1-15
France, 31st International Automobile Salon, Paris	Oct. 7-17
Great Britain, 31st International Automobile Exposition, London	Oct. 14-23

### Show Business

Manager of the National Automobile Show in New York is Alfred Reeves, 366 Madison Ave., N.Y.C. Inquiries concerning all matters connected with the national show should be addressed to him. AUTOMOTIVE INDUSTRIES will be pleased to furnish names and addresses of local show managers on request.

National Automobile Show, New York	Oct. 27-Nov. 3
Italy, 10th International Automobile Salon, Milan	Oct. 28-Nov. 8
Buffalo, N. Y., Automobile Show	Oct. 30-Nov. 6
Cincinnati Automobile Show	Oct. 31-Nov. 6
Great Britain, 13th International Commercial Automobile Exposition (trucks and buses), London	Nov. 4-13
Chicago Automobile Show	Nov. 6-13
Akron Automobile Show	Nov. 6-12
Brooklyn Automobile Show	Nov. 6-13
Columbus Automobile Show	Nov. 6-13
Detroit Automobile Show	Nov. 6-13
Kansas City, Mo., Automobile Show	Nov. 6-13
Newark, N. J., Automobile Show	Nov. 6-13
Philadelphia Automobile Show	Nov. 6-13
Pittsburgh, Pa., Automobile Show	Nov. 6-13
Toronto, Ont., Automobile Show	Nov. 6-13
Great Britain, 36th Scottish International Automobile Exposition, Glasgow	Nov. 12-20
Baltimore, Md., Automobile Show	Nov. 13-20
Cleveland, Ohio, Automobile Show	Nov. 13-20

Jersey City, N. J., Automobile Show,	Nov. 13-20
Milwaukee, Wis., Automobile Show,	Nov. 13-20
Springfield, Mass., Automobile Show,	Nov. 14-20
St. Louis, Mo., Automobile Show,	Nov. 14-21

### CONVENTIONS AND MEETINGS

Export Managers Club, 20th Anniversary Get-Together, Hotel Pennsylvania, New York	March 30
S.A.E. Regional Transportation and Maintenance Public Utility Meeting, Baltimore, Md.	April 15-16
International Association for Testing Materials, Second International Congress, London, England	April 19-24
S.A.E. National Tractor and Industrial Power Meeting, Peoria, Ill.	April 21-23
National Machine Tool Builders Association, Spring Convention, Edgewater Beach Hotel, Chicago	May 3-4
41st Annual Convention and Exposition of the American Foundrymen's Association, Milwaukee	May 3-7
S.A.E. Summer Meeting, White Sulphur Springs, W. Va.	May 4-9
National Battery Manufacturers Association, Spring Convention, Shoreham Hotel, Washington, D. C.	May 13-14
American Society of Mechanical Engineers, spring convention, Detroit	May 17-21
National Association of Purchasing Agents, 22nd Annual Convention, William Penn Hotel, Pittsburgh, Pa.	May 24-27
American Petroleum Institute, Mid-Year Meeting, Colorado Springs, Colo.	June 1-3
Second World Petroleum Congress, Paris, France	late May—early June
Automotive Engine Rebuilders Association, 15th Annual Convention, Chicago	June 21-24
American Society for Testing Materials, 40th Annual Meeting, New York	June 28-July 2
S.A.E. National Aircraft Production Meeting, Los Angeles, Calif.	Oct. 7-9
S.A.E. Annual Dinner, Commodore Hotel, New York	Oct. 28
American Petroleum Institute, 18th Annual Meeting, Stevens Hotel, Chicago	Nov. 9-12
SAE National Production Meeting, Flint, Mich.	Dec. 8-10

### CONTESTS

Indianapolis Speedway, 500-Mile International Sweepstakes	May 31
31st Annual Grand Prix of the Automobile Club of France, Linas-Montlhéry	July 4
Pan American Cup Race, Roosevelt Raceway	July 5
National and International Soap Box Derby Finals, Akron, Ohio	Aug. 15
Roosevelt Raceway, 400-Mile George Vanderbilt Cup Sweepstakes	Sept. 6
Los Angeles, 500-Mile International Sweepstakes	Nov. 28

# Just Among Ourselves

## The Bourbon Unions

THE United Automobile Workers International Union continues its merry career of ignoring important issues in current strikes, at the same time fanning others to a factitious importance for use as a smoke screen.

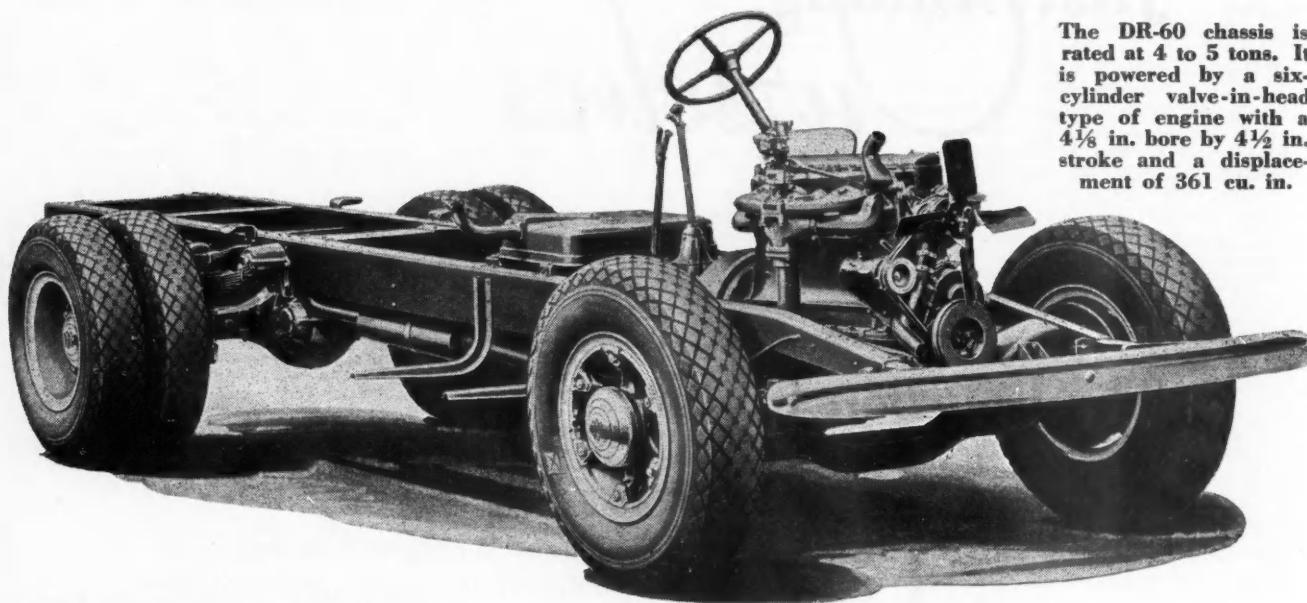
Item: In the matter of the Chrysler strike, the UAW did not order the strike so it will do nothing to get the strikers out of the plant. So far the position is logical, except that it admits its membership is out of control, a dangerous position for any union in the long run.

But the union *will* sponsor a mass meeting to protest against the eviction of sitdowners from plants and *will* coerce municipal and other authorities into permitting the mass meeting and calling off evictions.

Item: The mass meeting is called to "protect the right to strike." We do not believe that anyone recently has questioned in a serious way the right of workers to strike. The issue at the moment is the right of workers to continue illegal occupation of plants in which they refuse to work. There is no connection between the two issues.

Wherever the union has claimed rights, it has also implied the right to act as arbiter, judge and jury in the case. Sooner or later, we believe, this will alienate the public's sense of fair play.—H. H.

# New Line of IHC Trucks

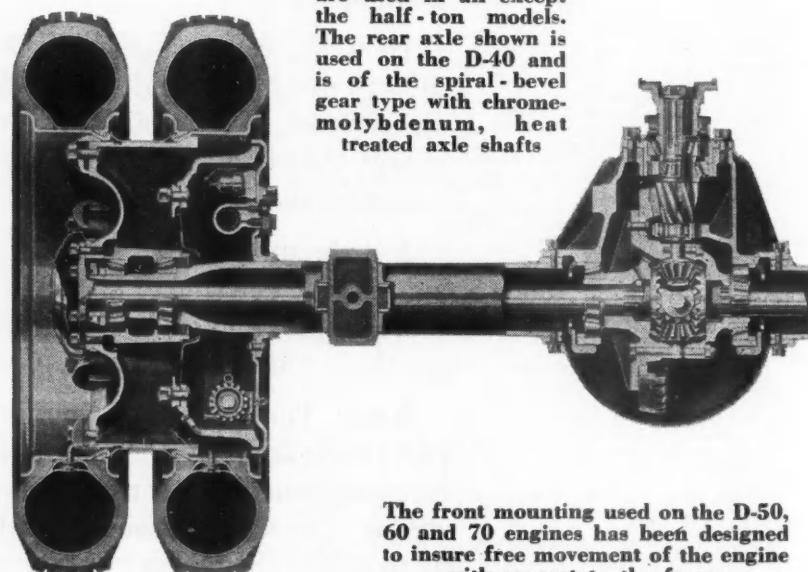


The DR-60 chassis is rated at 4 to 5 tons. It is powered by a six-cylinder valve-in-head type of engine with a 4½ in. bore by 4½ in. stroke and a displacement of 361 cu. in.

INTERNATIONAL HARVESTER COMPANY has just announced a complete new line of trucks referred to as the D line. It ranges in capacity from light delivery units to large six-wheelers, and includes conventional four-wheel units, six-wheelers with both four-wheel drive and trailing axles, and cab-over-engine types. The complete line consists of 26 models with 77 lengths of wheelbase, the gross weights ranging from 4400 to 62,000 lb. Brief specifications of the line are shown in tabular form herewith.

Cab-to-rear-axle dimensions are standardized in the new line, which permits of mounting stock-size or standard-length bodies and also makes for body interchangeability. Front axles are set back, and this, together with a relocation of the rear axles and cabs has led to a more desirable weight distribution, with more weight on the front wheels than in the past. Not only is the weight of the combined body-and-pay load distributed to better advantage, but the gross weight as well. The distance from the back of the cab to the center of the rear axle has been increased in practically every case.

Two general designs of engine are employed for this new truck line, the L-head type, which powers trucks of 1½-ton rating and less, and the valve-in-head type, which powers all trucks from 2 tons load rating up. The L-head engine on the ½- and ¾-ton models has a piston displacement of 213 cu. in., while that on the 1½-ton model has a displacement of 232 cu. in. Features of

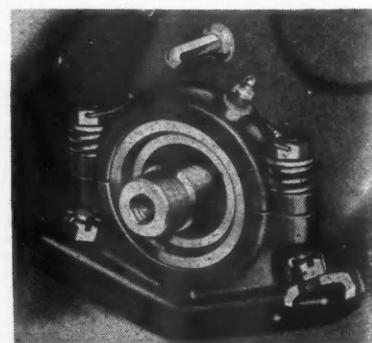


Full-floating rear axles are used in all except the half-ton models. The rear axle shown is used on the D-40 and is of the spiral-bevel gear type with chrome-molybdenum, heat treated axle shafts

The front mounting used on the D-50, 60 and 70 engines has been designed to insure free movement of the engine with respect to the frame

these engines include counter-balanced crankshafts, replaceable shell bearings, full-pressure lubrication, hardened exhaust-valve-seat inserts, downdraft carburetion, mechanical fuel pumps, and oil-bath-type air cleaners. With one exception, all of the engines used are of six-cylinder design.

Types FA and FB, which power the larger models, are of the valve-in-head type, and sectional assembly drawings of one of these engines are shown

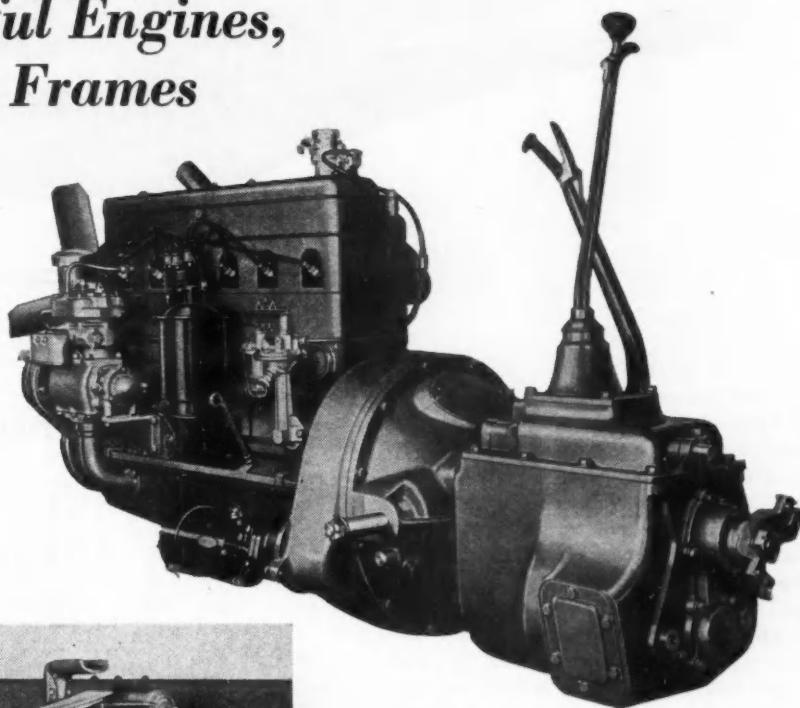


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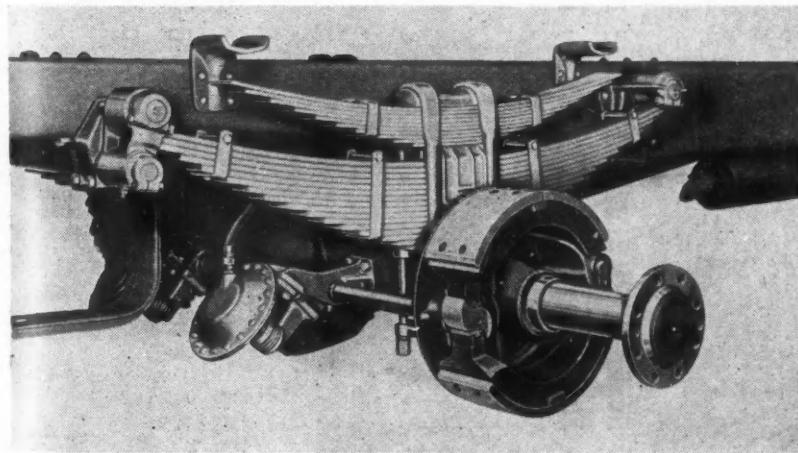
## *Selection of 26 Models, 77 Wheelbase Lengths, More Powerful Engines, Stronger Frames*

elsewhere in this issue. These engines have replaceable cylinder liners, counter-balanced crankshafts with vibration dampers, full pressure lubrication, replaceable main and connecting-rod bearings, hardened exhaust-valve-seat inserts, downdraft carburetion, oil-bath-type air cleaners, and fan-cooled generators.

The present D line of trucks replaces the C line, which has been marketed by International Harvester Company for a number of years back, and nearly all



The engine, clutch and transmission of the DR-70. At the front can be seen the air compressor



In the air-brake system a heavy-duty, two-shoe, rigid, anchor type brake is employed

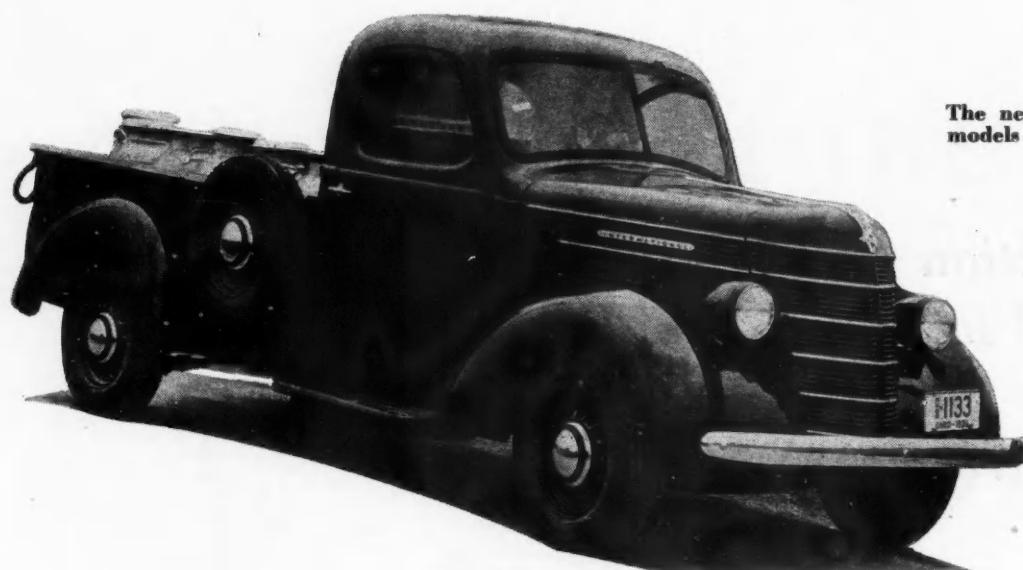
of the D-line models correspond to a C-line model of the same tonnage rating. Two models which had no equivalent in the C line are the D-5, a light truck intended for multiple-stop service, which has chassis dimensions similar to the D-2 but carries a much smaller, four-cylinder engine (3 1/4 by 4-in., 133 cu. in., 33 hp. at 2800 r.p.m.). The other is the new 1 1/2-ton seat-over-engine type, known as the Model D-300, and with dual-ratio rear axle as the

DS-300. This recent addition to the International line was described in AUTOMOTIVE INDUSTRIES some time ago.

Most of the new models carry engines of greater displacement and higher output rating than the models they replace. Thus the 1 1/2-ton Model D-30 has a six-cylinder engine of 3 5/16-in. bore by 4 1/2-in. stroke instead of 3 5/16-in. bore and 4 1/2-in. stroke, so the displacement was increased from 213 to 232 cu. in. and the rating changed from

79 hp. at 3400 r.p.m. to 81 hp. at 3200 r.p.m. Rated engine speeds were lowered slightly throughout the line. The D-35 and DS-35 have engines of 241.5 instead of 223 cu. in. displacement and the rated speed of that model also was reduced from 3400 to 3200 r.p.m. The D-40 now carries a six-cylinder 3 1/2 by 4 1/2-in. engine, while the C-40 had a 3 7/16 by 4-in. engine. The greatest increase in engine size occurred in the 4-5-ton model, which formerly carried an engine of 298 cu. in. displacement but now has one of 401 cu. in.

Some of the powerplants have three-point support on the frame, and a new front-end mounting, used on Models D-50, D-60, DR-60 and DR-70, is illustrated by one of the photographs reproduced herewith. Flexibility is provided by supporting the engine in a trunnion, by holding the cap of the trunnion down with coil springs, and



The new IHC line is replete with models in the small capacity range

Mechanical drawings of the Model FB engine appear on pages 505 and 506

by providing the trunnion with a rubber bushing or liner.

All truck models have deeper, heavier frames and more powerful braking systems than in the past. Front spring-pad capacities have been increased to provide for the greater proportion of the load now carried on the front axle. Clutch and transmission torque capacities have been increased to match the greater torque of the engines. Helicogear transmissions are used on the larger models, with five forward speeds, of which the fourth is the direct drive. This provides an overdrive fifth speed which holds down the engine speed, thus saving wear and tear on the engine and reducing the fuel consumption.

Hydraulic brakes of the internal, self-energizing, two-shoe type are standard equipment on all models of the new line. Standard equipment on the larger units includes booster brakes of the vacuum-suspended type. Air brakes are standard equipment on the Model DR-70 and the larger six-wheel units; they are available on the intermediate units at extra cost. Other features of design include full-floating rear axles (except on the  $\frac{1}{2}$ -ton models), needle-bearing universal joints, and self-aligning propeller-shaft center bearings in the long-wheelbase chassis. A sectional view of one of these center bearings is reproduced herewith.

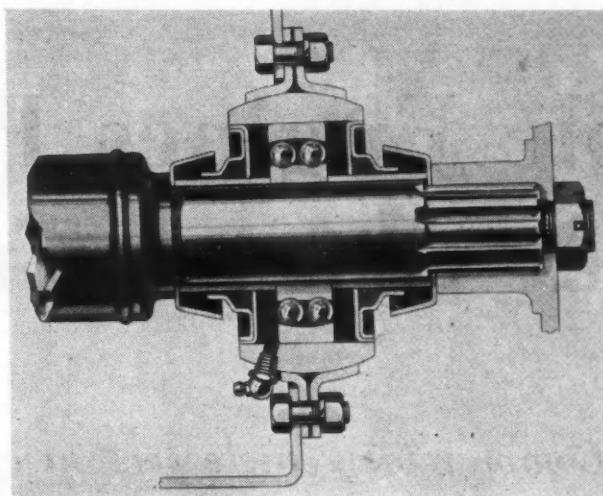
The new cabs are of welded, all-steel construction, are insulated against the elements, and have provision for proper ventilation. They are more roomy than previous International cabs and have deeply-upholstered and adjustable seat and back cushions. Wide doors permit easy entrance and exit, and all controls are conveniently located. Windshields

## Specifications of the D-Line

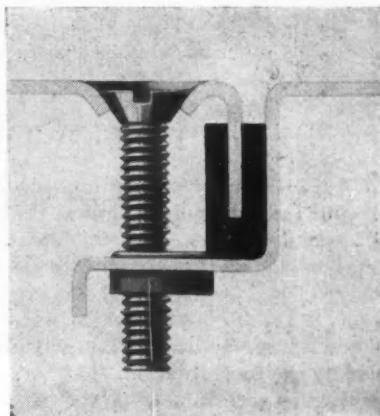
### Four-Wheel Models

Model	WHEELBASES				Gross Vehicle Weight (Lbs.)	No. Cyl.	Bore and Stroke	ENGINE			
	113	125	39	51				Disp.	Max. H.P.	Max. Torque	
D-2					4,400	6	$3\frac{1}{8} \times 4\frac{1}{8}$	213	78	155	
D-5	113	125	39	51	4,400	4	$3\frac{1}{4} \times 4$	133	33	89.5	
D-15	130	128	56	57	$\frac{3}{4}$ -1	6	$3\frac{1}{8} \times 4\frac{1}{8}$	213	78	155	
D-30	155	173	84	102	$1\frac{1}{2}$	12,000	$3\frac{1}{8} \times 4\frac{1}{2}$	232	81	170	
DS-30 (2-Speed Axle)	128	155	57	84	$1\frac{1}{2}$	12,100	6	$3\frac{1}{8} \times 4\frac{1}{2}$	232	81	170
		173		102							
M-3 (Milk Truck)	118	...	...	1	7,100	4	$3\frac{1}{8} \times 4\frac{1}{2}$	186	41.5	125	
D-35	137	149	60	72	$1\frac{1}{2}$ -2	13,000	6	$3\frac{1}{8} \times 4\frac{1}{2}$	241	84	175
		161		84							
		179	102								
DS-35 (2-Speed Axle)	137	149	60	72	$1\frac{1}{2}$ -2	13,100	6	$3\frac{1}{8} \times 4\frac{1}{2}$	241	84	175
		161		84							
		179	102								
D-40	134	146	60	72	2-3	14,500	6	$3\frac{1}{8} \times 4\frac{1}{2}$	258	89	192
		158		84							
		176	102								
D-50	137	149	60	72	3-4	17,000	6	$3\frac{1}{4} \times 4\frac{1}{2}$	298	93.5	218
		161		84							
		179	102								
D-60	149	161	72	84	$3\frac{1}{4}$ -4 $\frac{1}{2}$	20,000	6	$4\frac{1}{8} \times 4\frac{1}{2}$	361	111.5	268
		179	102								
		197	120								
DR-60 (Double-Reduction Axle)	149	161	72	84	4-5	20,000	6	$4\frac{1}{8} \times 4\frac{1}{2}$	361	111.5	268
		179	102								
		197	120								
DR-70 (Double-Reduction Axle)	149	161	72	84	4-6	24,000	6	$4\frac{1}{8} \times 5$	401	114	308
		179	102								
		197	120								

Double row, self-aligning, center bearings are used on the long-wheelbase models



Below—Toe-board and floor-board seal



## of International Trucks

### Four-Wheel Models

Model	Wheelbases	Cab to Axle Dimensions	Rated Capacity (Tons)	Gross Vehicle Weight (Lbs.)	ENGINE					
					No. Cyl.	Bore and Stroke	Disp.	Max. H.P.	Max. Torque	
A-7 (Double-Reduction Axle)	160	72	5-7½	37,000	6	4½ x 5½	525	123	358	
	180	92								
	200	112								
	225	137								
A-8 (Double-Reduction Axle)	160	72	7½	37,000	6	5 x 5½	648	140	460	
	180	92								
	200	112								
	225	137								

### Cab-Over-Engine Models

D-300 (Cab-Over-Engine Type)	99	84	1½-2	12,000	6	3½ x 4½	232	81	170	
DS-300 (Cab-Over-Engine Type) 2-Speed Axle	99	84	1½-2	12,100	6	3½ x 4½	232	81	170	

### Six-Wheel Models

D-186-T	173	102	1½-3½	18,000	6	3½ x 4½	232	81	170	
DS-186-T	173	102	1½-3½	18,000	6	3½ x 4½	232	81	170	
D-216-T	176	102	2-4	21,000	6	3½ x 4½	241	84	175	
D-246-T	161	84	2½-5	24,000	6	3½ x 4½	298	93.5	218	
D-246-F	161	84	2½-5	24,000	6	3½ x 4½	298	93.5	218	
D-346-T	161	84	3½-7	34,000	6	4½ x 5	401	114	308	
D-346-F	161	84	3½-7	34,000	6	4½ x 5	401	114	308	
DR-426-F	161	84	5-8	42,000	6	4½ x 5	450	11.5	335	
AR-626-F	180	92	10-15	62,000	6	5 x 5½	648	140	460	
	253	165								

T—Trailing Axle. F—Dual Drive. R—Double-Reduction Axle. S—Two-Speed Axle.

are of the sloping V, one-piece, clear-vision, ventilating type. A large cowl ventilator is provided.

Considerable attention naturally was paid to the matter of styling, in the development of this new line. In the words of Chief Engineer W. D. Reese of the I. H. C. Motor Truck Division, simplicity and good taste are the keynotes of the styling, and dignity and beauty were aimed at in every line. Elements of the new styling include long parallel louvers sweeping in almost continuous lines around hood sides and grille, which latter is of rounded form. Fenders have curved skirts and creased crowns.

The de luxe panel bodies are steel bodies built of large-size stampings so as to reduce the number and length of welded seams. These bodies are said to be quite light, yet very rigid. Body frames are formed with cross sills, side pillars and inner panels, longitudinal channel ribs, roof channel rail and roof-bows, all flanged, braced and welded into a rigid unit which is essentially tubular in shape. A pressed-in belt molding constitutes the only trim. Purchasers are offered a choice of colors.

One of the illustrations shows a new design of toe- and floor-board seal which has been developed by International for its new all-steel cabs. A channel-type rubber combination seal and anti-squeak serves to insulate the toe- and floor-boards from the rest of the cab structure. The cross section graphically illustrates how the flanged edges are cushioned in rubber to eliminate undesirable noise.

# Convertible Engines Power Many of the German Trucks

HERE was nothing unorthodox or radical from a technical standpoint in the commercial-vehicle section of the Berlin automobile show, but the show permitted of a general survey of trends in the commercial vehicle industry, which are largely affected by the fuel situation.

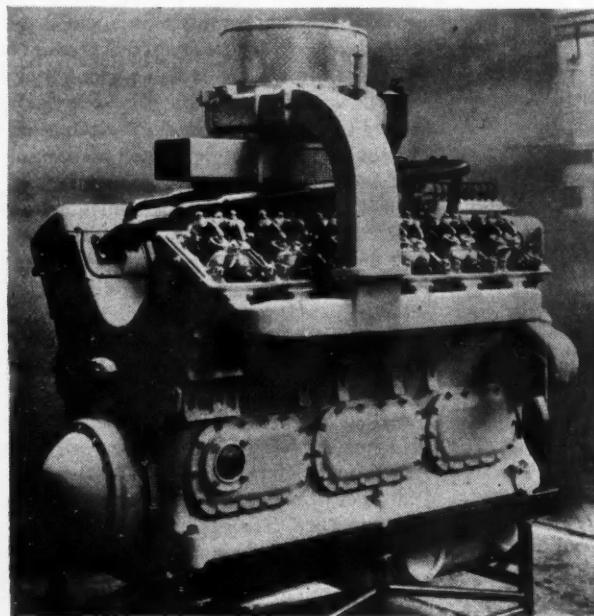
Since the accession to power of the National-Socialist Government, determined efforts have been made to cut down imports as much as possible and to make the country independent of foreign sources of motor fuel. Three or four years ago it was difficult to see in what direction the greatest promise lay, and as a result equal encouragement was given to the Diesel engine (because of its low specific consumption), to industrial gases carried under pressure in metallic bottles, and to gas producers. The Diesel development will be discussed later. Very keen competition soon developed between bottled gas and gas producers, and at first the latter seemed to be getting the better of

*Commercial vehicle section of the Berlin Automobile Show displayed new models adaptable to domestic fuels*

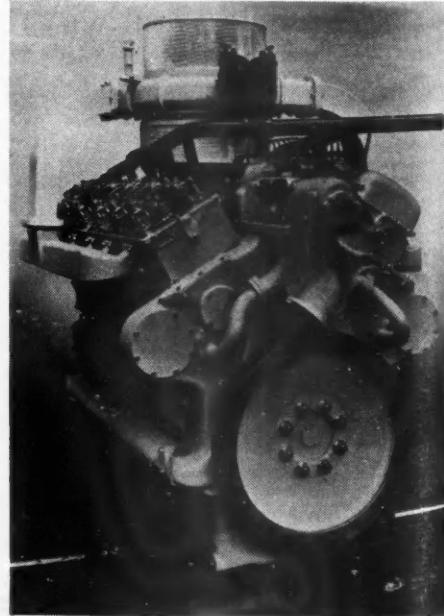
it, for one reason because the organization of a distributing system for bottled gas met with unforeseen difficulties and naturally required considerable time.

At the present, however, the bottled gas distributing system has been well established, and this, together with the introduction of such liquefied gases as Ruhrgasol (corresponding to our butane —Editor) which can be stored at low pressure and gives a relatively high mileage per charge (roughly 120 miles for a 5-tonner on two cylinders) seems to have turned the tide in favor of the

use of bottled gas, for one reason because these liquefied gases enable the engine to develop practically the same power as on gasoline and benzol. The so-called lean (low-heat-value) gases, which are stored under pressures of 150-200 atmospheres, are used mainly in municipal vehicles. In Germany, municipal bus services are generally operated by the city governments, which also operate the electric and gas plants. It is not surprising therefore that the cities prefer to use a fuel for their buses which they produce themselves and which costs them compara-



Humboldt-Deutz V-8 500-hp, supercharged Diesel railcar engine, front and rear-end views. The entire block is cast of aluminum alloy



By Edwin P. A. Heinze

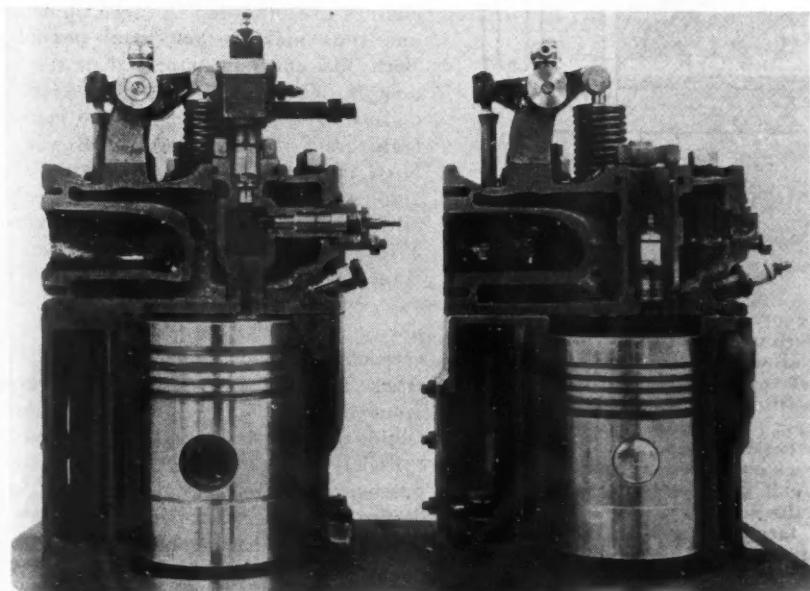


Streamlined bus on a 100 hp. Mercedes Benz Diesel chassis. The body is by Walter Vetter

tively little. The bus engines require very few changes, and the installation required on the buses is relatively inexpensive. The only large capital outlay required is for gas compressors, gas bottles, and the distributing organizations. In Berlin, mobile gas storage plants are provided, which recharge the gas bottles of the vehicles at outlying terminal stations. With these "lean" gases the engines generally develop about 90 per cent as much power as on gasoline. On the other hand, producer gas from the earlier types of producer caused a loss in engine power of 25 per cent and even more, and this

(Right) Arrangement of gas bottles between chassis frame and body on Phänomen light truck

(Below) Showing how the Büssing Diesel engine is converted for use as a gas engine with spark ignition



gave the advantage to the "lean" gas. However, the manufacturers of gas producers also have been busy and tried to improve their product, and they now claim that they have succeeded in increasing the heat value of the gas of their producers when operating on wood from about 112 to about 140 B.t.u. per cu. ft., so that if the compression ratio is increased to 8, the power loss can be kept down to 10 or at most 15 per cent. As compared with bottled gas, the gas producer has the advantage that it gives the vehicle a practically unlimited range, as the fuels used for such plants are available practically everywhere, and a large supply can be carried on the vehicle.

The most widely used make of gas producer is still the Imbert, on which a bonus is paid by the Government because it consumes wood, of which there

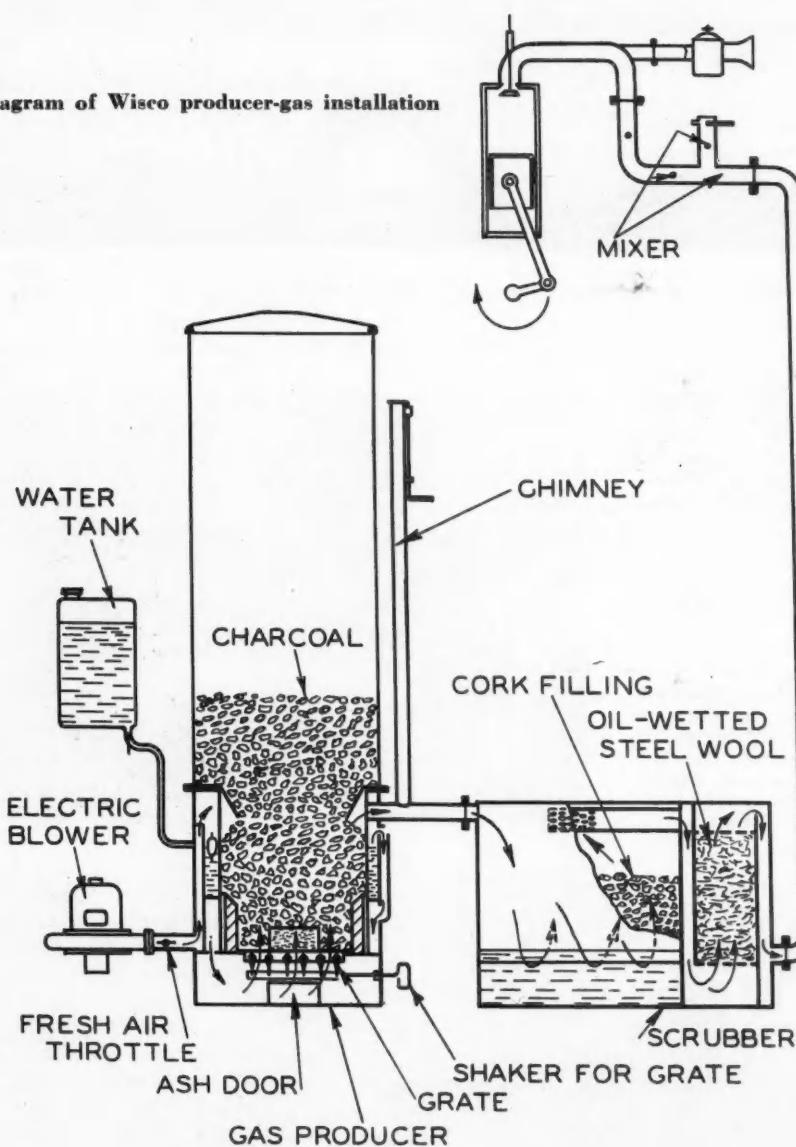
is a plentiful supply in the country. Next in order come producers of the Wisco type, which operate on charcoal. Both of these systems have been developed to a high degree, as regards both the amount of attention required in service and the flexibility of operation. Even after a considerable period of rest (while the tank has been unloaded, for instance) the engine can be started immediately on producer gas, and the provision of gasoline emergency equipment is no longer required with these plants. The Wisco is claimed

to produce a gas of 159 B.t.u. per cu. ft. Much work is being done on producers which shall be capable of handling such fuels as anthracite and various kinds of coke, especially lignite and peat cokes, which are very cheap in Germany. However, these producers still require a good deal of attention and leave something to be desired from the standpoint of flexibility.

German commercial vehicle manufacturers have kept pace with these developments in the fuel field, and all of the leading ones offer so-called "uni-

versal" engines which, while originally designed as Diesel engines, can be readily converted to run on bottled gas or producer gas. The Robert Bosch company has developed a special magneto which is interchangeable with its fuel-injection pumps. A typical example of such a universal engine is the Büssing-NAG Diesel (see illustration). To make the conversion, the precombustion chambers of the engine are removed from the cylinder heads and plain cylinders are inserted in their place, into which the spark plugs are screwed. Alternately, the spark plugs may be inserted in bosses in the sides of the cylinder heads, ordinarily used for compression plugs. The compression ratio is suitably reduced by fitting pistons of less height above the piston-pin axis.

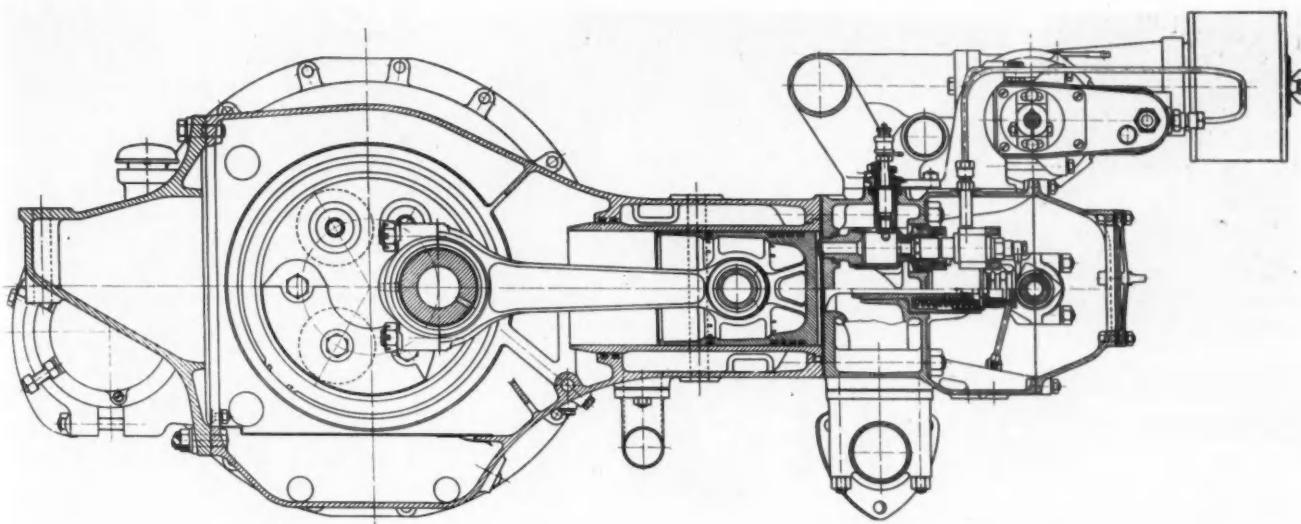
Diagram of Wisco producer-gas installation



Air enters the generator and passes over the surface of the water in the jacket, where it becomes saturated with water vapor. The mixture of air and water vapor passes from the space above the water level to the superheating chamber. As the mixture continues through the gate to the fire bed, the steam is highly superheated and the air preheated. The gas produced in the reaction zone is withdrawn from the base chamber and passes once more through the space above the water level, where it gives up some of its heat to the water, and then on to the scrubber, where it is deprived of entrained dust and tarry material. The chimney at the side is opened for starting and also when the vehicle is stopped for considerable lengths of time

### Diesel Developments

Diesel development has now crystallized in Germany. This type of engine is being used for all trucks of more than 3-tons load capacity. Attempts were made also to introduce it on smaller trucks, and these seemed to meet with success at first, but now there appears to have been a face-about in the attitude of buyers with regard to the matter. The Diesel, being materially higher-priced than the carburetor engine, does not offer the same incentive to buyers in the small- as in the large-truck field, unless the small trucks have a very high annual mileage. The small-truck market in Germany is dominated by Ford and Opel, and these makers sell their trucks with carburetor engines only, and at very low prices. Probably for this reason, and to regain a section of the market lost to these makers, even Daimler-Benz now offer their light trucks with carburetor engines again, using passenger-car engines for some of their models, as these engines are produced in large numbers and thus make a low price possible. Both Opel and Ford supply their trucks now in load capacities up to 3 tons, and all of the principal German manufacturers — Daimler-Benz, Büssing-NAG, and Krupp — have seen the advantage of being in position to supply all models up to this capacity with carburetor engines if desired. Henschel, Hanomag and MAN continue to offer only Diesel-engined trucks in this capacity range. Daimler-Benz have increased the load rating of the small truck introduced by them last year from 1.1 to 1.5 tons, and if a Diesel engine is desired they employ the four-cylinder 45-hp. engine developed for passenger-car use. It is identical in design with other Daimler-Benz Diesels, but instead of having heating plugs it has the new Bosch electric gas-oil va-



Büssing six-cylinder horizontal Diesel engine mounted under the frame in front, and a vertical section of it

porizer as an aid to starting in cold weather.

Development of very high-powered Diesel engines for use on vehicles designed for operation on the new super highways is in abeyance for the present, but considerable work is being done on new engines for railcars. This development is being guided by specifications issued by the German Railways, which, the same as the Army, have standardized certain sizes and design features. These standard engines, which embody no new design features, are being built by all of the leading works. One of them is a V-8, 115-hp. engine developed by MAN, which embodies the conical combustion or spray chamber together with the lateral air

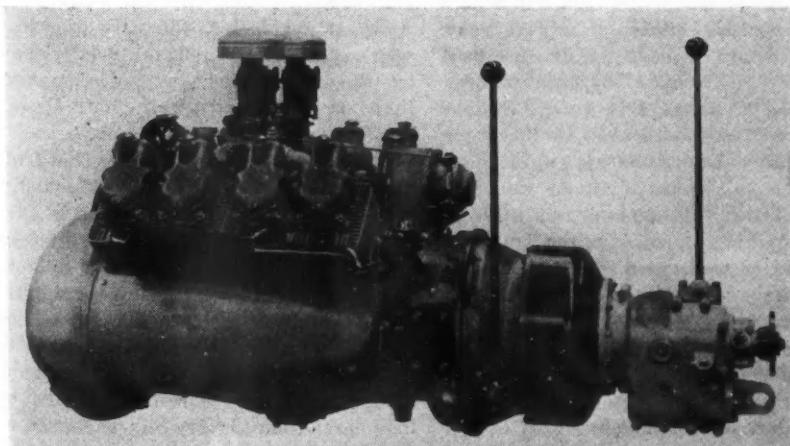
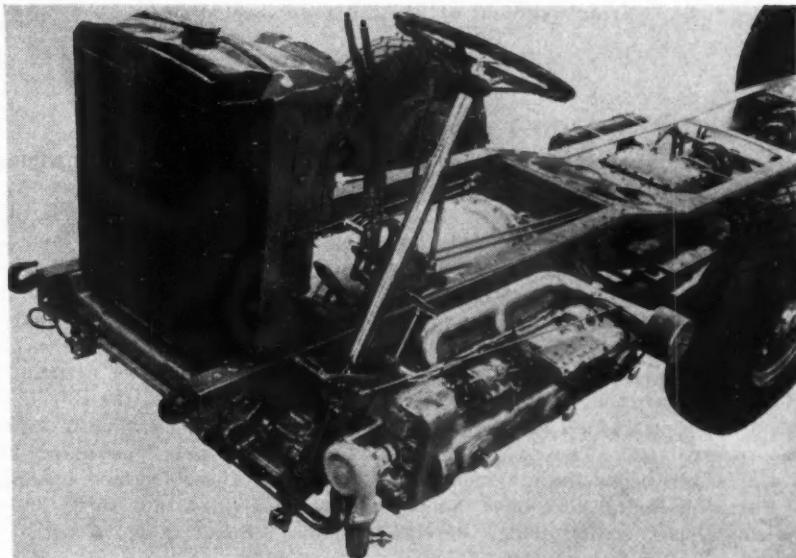
cell which has characterized MAN automotive engines in recent years.

The Büssing-NAG company has re-

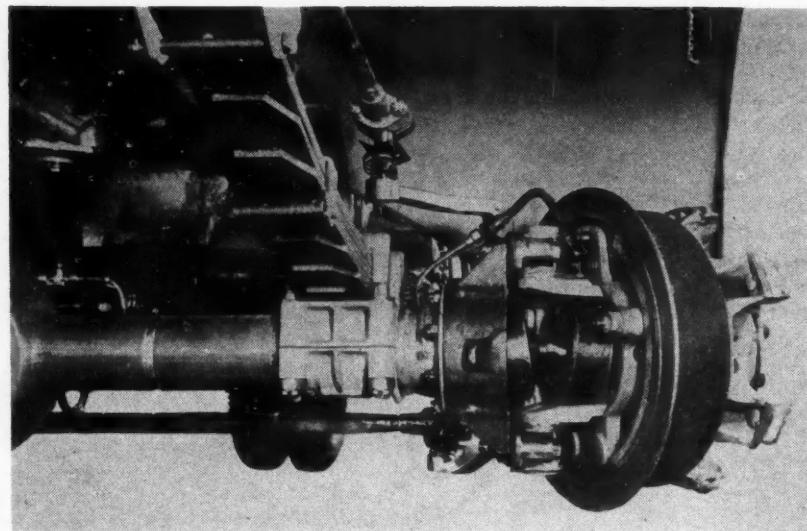
placed its three-cylinder 45-hp. engine by a four-cylinder 55-hp. model of the same design. It also has added a five-cylinder 80-hp. Diesel with vertical pre-combustion chamber.

The Oberhansli Diesel system has further established its hold in Germany, where the VOMAG firm, which last year was experimenting with the Thomas & Stuhr system, has reverted to it. In addition, the engine-manufacturing firm of Breuer of Frankfort-Höchst has taken up the Oberhansli system and now offers four models suitable for automotive work.

Humboldt-Deutz Motorenwerke, which some time ago merged with the Magirus Company, have added one new automotive Diesel model, a three-cylinder engine built into a road tractor; but together with the German Railways and three other German manufacturers they have developed a twelve-cylinder horizontal-opposed engine of 275 hp. at 1500 r.p.m. The regular Deutz



Krupp V-8 air-cooled carburetor engine with hydraulic torque converter



Front axle end of Büssing four-wheel drive truck

precombustion chamber is employed, but instead of being parallel with the cylinder axis, it slopes down slightly toward the cylinder. Cylinders have wet liners. Bore and stroke are 5.12 and 7.48 in. respectively. The crankcase is split vertically and the crankshaft is supported in seven bearings. Light-alloy pistons are used. Two Bosch fuel-injection pumps, each for one bank of cylinders, are mounted at the forward end. The two camshafts are arranged below the crankshaft.

Humboldt-Deutz also have another railcar Diesel engine under development, a V-12 with cylinders of 5.90-in. bore and 7.87-in. stroke and an angle of 60 deg. between cylinder banks. The rating is 360 hp. at 1400 r.p.m. Built in an aluminum-silicon-alloy and provided with a Büchi supercharger it develops 500 hp. and weighs only 5560 lb. Particulars of the design are shown in the accompanying illustration.

Another "flat" twelve of similar type has been introduced by the Triebwagen Co. of Kiel. This engine also is of the precombustion-chamber type and is rated 250 hp., while a flat eight with a Lanova-type head is rated 180 hp. The Henschel Company has brought out a new straight eight, 170-hp. Lanova-type engine for its large six-wheelers.

### Tractors

Three years ago a small German company started the production of a novel type of light tractor equipped with a single-cylinder Diesel engine of about 10 hp. It was of very simple design and sold at a low price, and its success was such that it led to the organization of numerous other companies for the manufacture of similar tractors. Since

then most of these companies have started building tractors of more conventional design and with larger, two-cylinder Diesels up to 20 hp., and the larger and older companies also have joined in and brought out similar small tractors. While in the original single-cylinder tractor the engine was located at the rear, in later designs it was placed in front and the so-called Baby Diesel tractor has gradually approached the conventional type in lay-out. In Germany, Diesel-engined tractors may now be divided into three groups, as follows: Small tractors with engines up to 20 hp.; intermediate-size tractors with three-and four-cylinder engines of up to 55 or 60 hp., and large tractors with engines up to 175 hp., the latter being designed for high-speed transport work.

### Chassis Design

As already mentioned, few changes have been made in the general design of commercial vehicles since last year. The tendency to place the driver's seat alongside the engine, to gain loading space, is growing. Büssing-NAG have introduced a six-wheeler of this type with a six-cylinder 180-hp. engine having four valves per cylinder and wet liners. The crankcase is drawn up high to the cylinder head. On the stand of this firm, as well as on that of Daimler-Benz, there was to be seen also a new standard troop-transport vehicle with steering wheels and propelling crawlers. No particulars are available regarding this vehicle.

Daimler-Benz have brought out a new three-tonner of conventional design which can be equipped optionally with a carburetor or a Diesel engine.

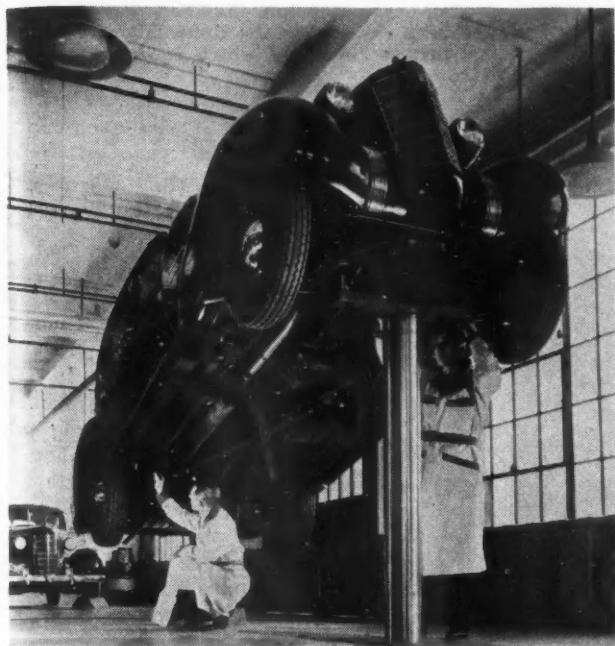
Opel is the first firm to place on the market a new 3-tonner complying with certain military requirements with respect to ability to operate across country. Purchasers of these trucks are granted a substantial reduction in the annual tax. The truck is of conventional design and carries a 64-hp. Buick engine of an earlier model, which, however, is completely manufactured in Germany.

The Hansa-Lloyd company is still the only firm which equips its stock trucks and buses with independent front springing. Henschel has rounded out its line by the introduction of a new 3-tonner with spiral-bevel-gear final drive and vacuum-boosted hydraulic brakes. Krupp has brought out a new V-8, 125 hp. aircooled carburetor engine fitted in a bus chassis. This engine has an aluminum crankcase with individual cylinders arranged in two banks at 90 deg. The bore is 3.62 and the stroke 4.80 in., the compression ratio is 5.4, and the rating speed 2500 r.p.m. Cylinder heads are of aluminum. The crankshaft runs in five bearings and connecting rods are mounted on the crankpins side by side. The valves, which are located in the cylinder heads, are operated by fully-enclosed pushrods and rockers, the camshaft being located centrally above the crankshaft. Two downdraft carburetors are fitted. The cooling air is supplied by a centrifugal blower, from which it is directed through cast-in channels to the jackets enclosing the finned cylinders. This engine is fitted with the Lysholm-Smith hydraulic torque converter which is being developed in Germany by Krupp.

The MAN company has brought out a 5-tonner equipped with a new V-8, 115-hp. Diesel engine, but is otherwise identical with other MAN chassis. The manufacturers of the small Phänomen trucks with four-cylinder-in-line air-cooled engines of 40 and 56 hp., now also supply chassis with gas cylinders for operation on gaseous fuel (see illustration).

Electric vehicles, the sale of which was expected to benefit materially from the "use home fuel" drive, are making little progress, although their design has been thoroughly modernized.

The production of synthetic fuel from coal is progressing rapidly in Germany, but it is doubtful whether it will be possible to produce gas oil in sufficient quantity. For that reason all makers of Diesel engines are now designing them in such a way that they can be operated also on lignite- and coal-tar oils, of which large supplies are available. Nothing more is being heard of the numerous heavy-oil carburetors which were so conspicuous at the last two Berlin shows, and it is believed that they are off the market for good.



Used exclusively by Oldsmobile for inspection purposes, this new twin post hoist makes accessible every detail of the under-construction to the inspectors who pass on the newly manufactured cars

## Difficult Task

International Harvester recently completed its greatest modernization program in anticipation of the demand for its 1937 line of trucks. We pin a rose on the broad lapels of the factory management of the IHC Springfield plant for the way in which the program was carried out. Consider the setting. Here was a group of old factory buildings on both sides of a wide creek. They had to raze portions of the old plant, erect three new buildings in their midst, bridge the creek, and what not. In addition, the buildings were interconnected by a system of overhead conveyors, some of the chains being just about the longest to be found anywhere. A conservative estimate places the total length of new conveyor lines at around 7½ miles.

## Makes Grade

Cemented-carbide tools which need no introduction to automotive production men were introduced most vividly to the general public by none other than Dr. Zay Jeffries, Carboloy chairman, over the Red Network of the N. B. C. early this month. He described the discovery of the electric furnace compound by Moissan, noted French scientist, in the 1890's, and its commercial production by a German in the

1920's. Today, cemented-carbide is the hardest metallic tool material known. Its harder grades are about three times as hard as tool steel and one of the grades has the highest compressive strength known to man—890,000 psi. Dr. Jeffries certainly gave the radio public something to think about!

## Fine Check

We understand that one of the large glass plants is using a newly-designed instrument for checking surface finish after rough grinding. If the finish is held within predetermined limits, there is less work and less time involved in the polishing operation. As we understand it, the instrument is a development of the Profilograph which is used for checking mirror finish on metallic surfaces, such as bearings and cylinders.

## Neon Power

A novel current interrupter device is going through its experimental stages. According to the manufacturer it's the answer to the problem of neon lamp applications for trucks, buses, taxicabs, and the like, since the unit can handle heavy current loads continually without any difficulty. This unit is amazing-

# Production Lines

ly simple to the eye although, internally, its construction is a dead secret for the time being.

## Random Notes

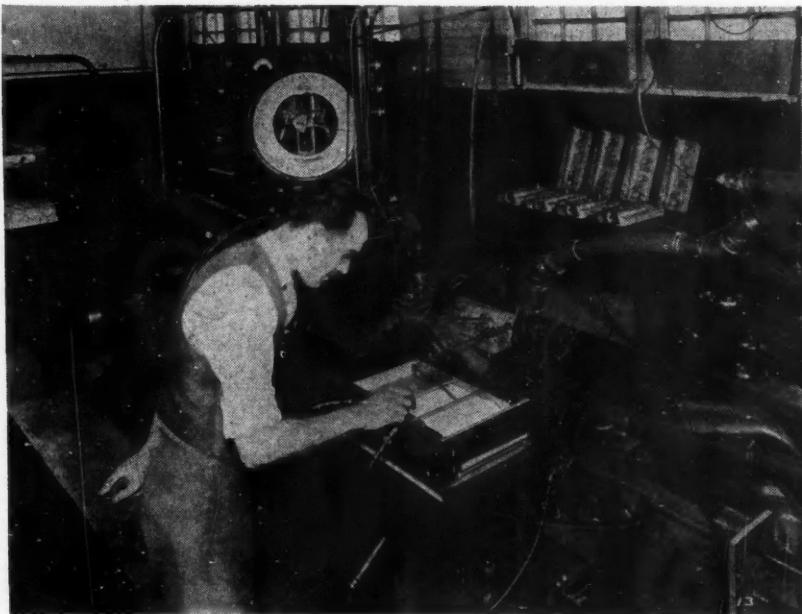
Tests giving conclusive proof that engine knock increases oil consumption, made by Professor H. A. Everett and J. J. Mikita of the Mechanical Engineering Laboratory at Pennsylvania State College, are reported in a recent issue of *National Petroleum News*. Factors such as fuel variation and spark position were carefully controlled, and the results showed that increased oil consumption always accompanied detonation. Variations in consumption followed similar changes in controlled factors.

Consumers of petroleum products, chiefly motor vehicle operators, contributed more than \$900,000,000 to the total petroleum tax bill of \$1,173,413,000 paid in 1936, according to an American Petroleum Industries estimate. Taxes on motor fuel and lubricants reached new high marks.

Breaking production records is getting to be a habit in the petroleum industry. A new all-time high mark of 3,210,794 bbl., as an estimated daily average, was recorded for the first week in February—From *Penn Grade Bulletin No. 2*.

—J. G.

**M**ANUFACTURING  
MANAGEMENT  
METALLURGY



Many combustion chambers have been checked in the Bohn laboratory, a corner of which is shown here

Says David E. Anderson:\*

that in one year a new system of manifolding has been added, perhaps resulting in improved performance. In another year, with the same manifolding, a new type of piston or a new combustion chamber form has been added and so on. A little change here or there is all that distinguishes the engine from that of the preceding year. The development of one year has necessitated the development of the next and this, over a period of time, has resulted in material improvements but, on the other hand, the product still falls short of being the coordinated design which would make the best use of current knowledge of many factors which can now be controlled and should be taken into full consideration.

A case very much in point is the common practice on the part of well-known car manufacturers to offer, for ex-

\* Chief Engineer, Bohn Aluminum and Brass Corporation.

**W**E have come a long way in the improvement of engine design during the past five years. If we can take another forward step in that direction, it will be an achievement which will have considerable economic value. It is the belief of this writer that by correlating the information we have on combustion chamber design, cylinder head materials and construction, and other factors of engine design such as carburetion, manifolding, valve timing and distribution, it is quite possible to take that step now and make it a big one.

If we can figuratively get a birdseye view of the automobile engine as it now appears in relation to the data that we have collected on demonstrated improvements both in mechanical and thermal efficiency, it would seem quite evident that certain available and practical elements of design must be blended properly in order to gain the full advantage which is derivable from present knowledge of both materials and design.

It is only within recent months that a real knowledge of combustion control began to be available. The matter has gone far beyond the simple expedients which we have used for years in spark timing. It is necessary, we know now, to work spark timing and combustion chamber design together in such a manner that the explosion times properly with the advancing crank angle at any and all engine speeds.

Furthermore, it is necessary, in order to obtain maximum efficiency, to take full advantage of the gains due to higher compression ratios and to blend these gains with the added advantages of proper shaping of the combustion

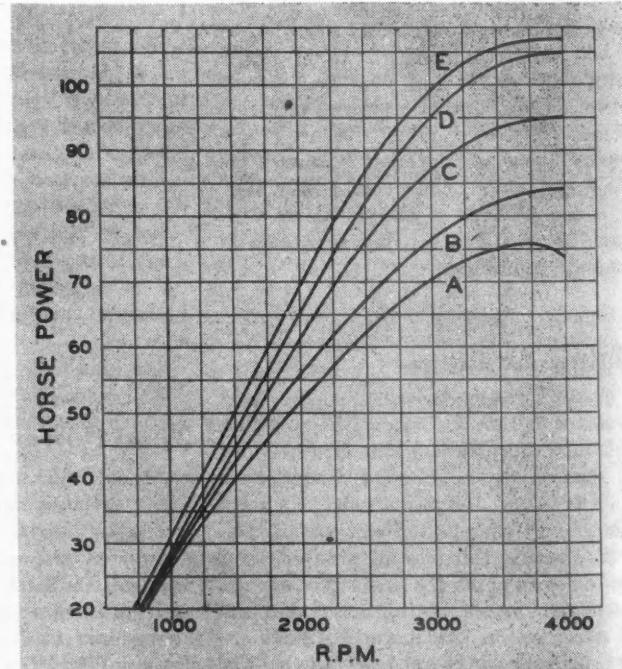
chamber for the particular compression used, for the available octane rating of the fuel and for the thermal characteristics of the metal used in the cylinder head.

Practically all of the engines used in our big production cars are developed rather than *designed* engines from the present-day standpoint. We find

## Let's Take A Step

Curve A was the engine as originally brought to the Bohn laboratory. Curve E is the same engine with the basic dimensions after final development. Intermediate curves show results of progressive steps. This is a good example of synthetic development because Curve E could be materially better with an analytical design.

A, Cast Iron Head.  
B, Aluminum Head.  
C, Aluminum Head and Dual Carburetion.  
D, Combustion Chamber and Piston Alteration.  
E, Improved Combustion Chamber, Altered Cam Timing and Improved Aluminum Piston.



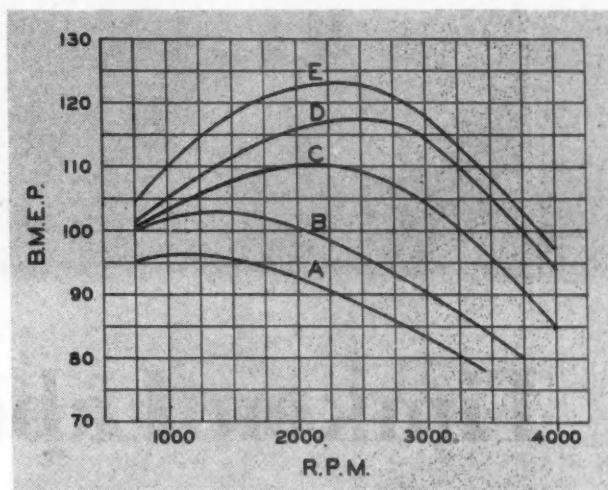
ample, an aluminum cylinder head as optional equipment. It is quite evident, since the aluminum cylinder head is simply an option, that the engine is not designed primarily for it. Consequently, although in one case, with the aluminum cylinder head, the compression is raised from 6.25 to 1 up to 7 to 1 with a gain, according to this particular car manufacturer's figures, of nearly 10 per cent in horsepower, an even greater gain would be possible with a fully co-ordinated design. The incongruity of this situation is that by the use of this type of cylinder head initially and with the entire engine designed for it, the same horsepower could be secured out of a smaller, lighter engine with considerably more economy due to the fact that an even higher compression could readily be used and the engine efficiency increased through unified design.

To put this in another way, the design of our current engines has been arrived at by *synthesis* rather than by *analysis*. We have now reached a stage in our knowledge of combustion and

we cannot use current engines and increase compression without running into roughness. This has been so marked that there has actually been a tendency on the part of one or two manufacturers to reduce compression. This

spark plug location, compression ratio and aluminum head together with other important design features such as valve timing, carburetion, ignition, water distribution, valve condition, etc. It is possible to bring these engines to 115

**Progressive development of the same engine as shown in the horsepower curves in the graph on the opposite page in mean effective pressure.**  
**A, Cast Iron Head.**  
**B, Aluminum Head.**  
**C, Aluminum Head and Dual Carburetion.**  
**D, Combustion Chamber and Piston Alteration.**  
**E, Improved Combustion Chamber, Altered Cam Timing and Improved Aluminum Piston.**



# Forward in Engine Design

many other factors of design which would indicate that the analytical method of design would result in a better and more efficient powerplant. This conclusion has not been reached entirely through theory or mathematics. It has been checked by actual dynamometer and road tests on hundreds of specimen combustion chamber forms employed with corresponding modifications of manifold design and the other elements which enter the problem.

If we look at the problem from other angles and ask ourselves what we are trying to achieve in the matter of engine design, we are brought back almost invariably to the matter of combustion control. By being able to control the character of the combustion with any given grade of fuel it is possible to achieve both smoothness of operation and high mean effective pressure with considerably higher compression ratios than are now generally in use.

It has been proved often enough that

seems to be taking a step backward rather than forward. The only reason for the retrogression is that roughness has been encountered, and roughness has been encountered because combustion has not been properly controlled or because of incorrect thermal characteristics, due to the use of the wrong metal or the improper disposition of the metal. A highly important factor in the control of combustion is the heat flow, through the walls of the combustion chamber and other parts exposed to the explosion temperatures, which must be correct in every particular.

It is not uncommon to have engines brought to our laboratory with a performance as poor as 105 to 108 B.M.E.P. or even less. On practically any of these engines we could have replaced the iron cylinder head with aluminum and got a gain of from 3 to 5 per cent. But this is not enough and it would not be economical to change for this small gain. By working with combustion chamber design, including

to 125 B.M.E.P. In other words, by correlating our knowledge and experience on all those factors which influence engine performance we are able to produce a combination that gives us a close approximation to the highest efficiency possible today. The resulting improved output of the engine has its effect throughout the entire car, even to making possible changes in axle ratio which enable the engineer to take advantage of this opportunity for greater economy. Couple together the influences of higher B.M.E.P., better combustion control, the proper design of pistons from a thermal as well as mechanical and structural standpoint, add to this the gains in smoothness of performance due to superior distribution and higher volumetric efficiency and the advantages of this type of engineering research become apparent.

\* It is not always economical to start from what theoretically should be the beginning in designing an engine. It

(Turn to page 504, please)

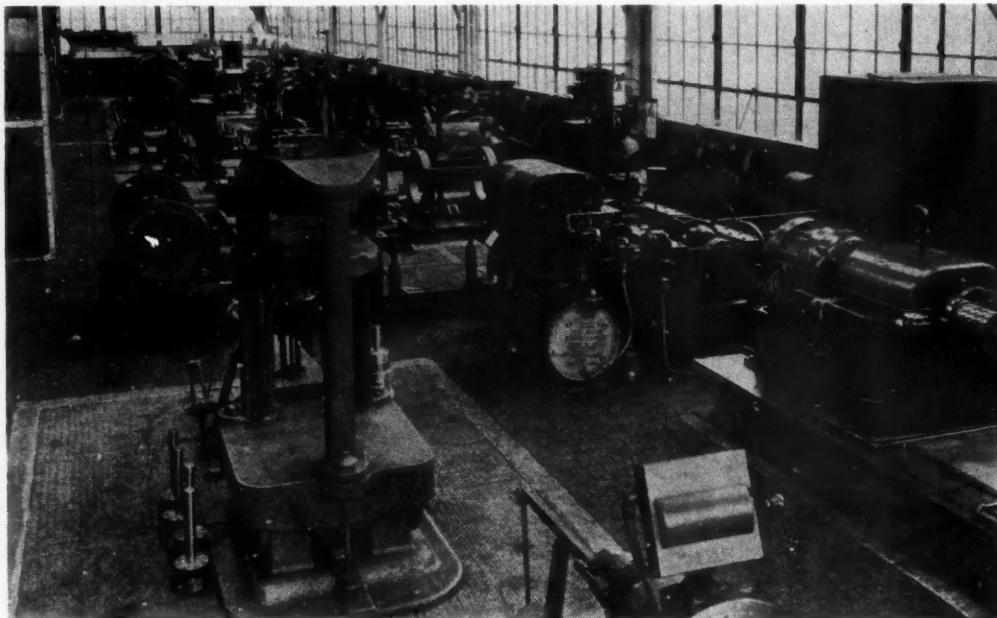


Fig. 1—General view in main room of laboratory.

## Timken Laboratory Enlarged

NEW quarters and additional equipment, much of it unique, have expanded the research and testing facilities of The Timken Roller Bearing Co. to a point where it is probably the most completely equipped unit of its kind in the United States. Housed in a single-story, well-lighted brick building, 150 by 80 ft., the laboratory stands across the street from the main office and factory, and is, therefore, easily accessible. Fig. 1 shows a general view of the main room in this new laboratory.

The far end of the building is occupied by a battery of 8 machines designed to test bearings up to 8 in. outside diameter to destruction under radial and thrust load. (Figs. 2 and 3). These machines consist of test spindles on which are mounted four bearings. Two spindles are connected by a coupling and driven through helical gears from a motor shaft; each shaft driving up to four sets of spindles. By changing the driving gears, a wide range of speeds may be secured.

Bearings are loaded in these machines by a hydraulic pressure system. Oil is supplied at 1800 lb. per sq. in. to the control system and each spindle is equipped with an adjustable relief valve. Through these valves the oil is fed to cylinders, of which there is one below each spindle. The cylinders and the pistons both float, transmitting the load through bell cranks on a fixed mounting to a yoke connected to the

center bearings on the spindle. The load is then transmitted to the bearings at each end of the spindle. By this arrangement all bearings receive the same load. Thrust load is applied through a lever system compensated by knife-edge levers to obtain concentric loads. In the case of small bearings, the thrust load is applied by dead weighted levers, while on the

larger bearings it is applied by hydraulic pressure.

Automobile rear axles and transmissions, together with the bearings used in them, are tested in a 75-100 hp. GE electric dynamometer together with two GE hydraulic dynamometers, as shown in Fig. 4. As installed in the Timken laboratory, a speed range of 200-4000 r.p.m. is available on the

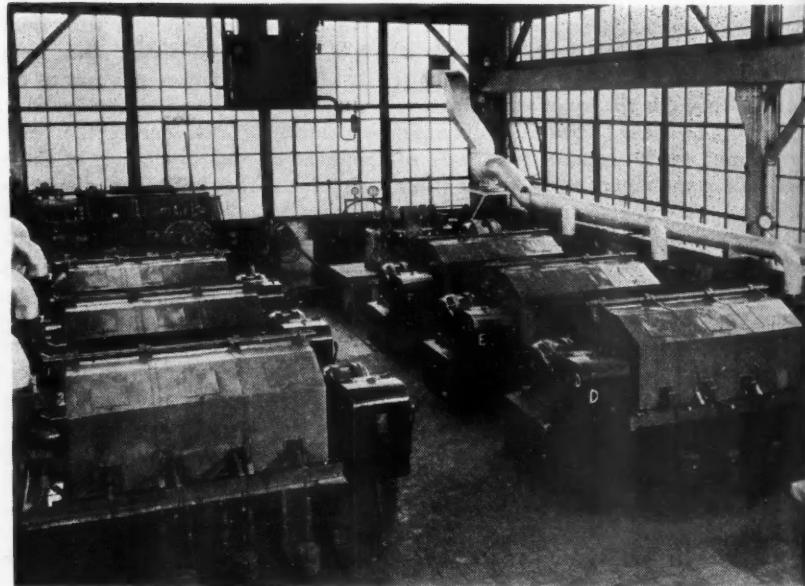


Fig. 2—Installation of eight bearing-endurance-testing machines

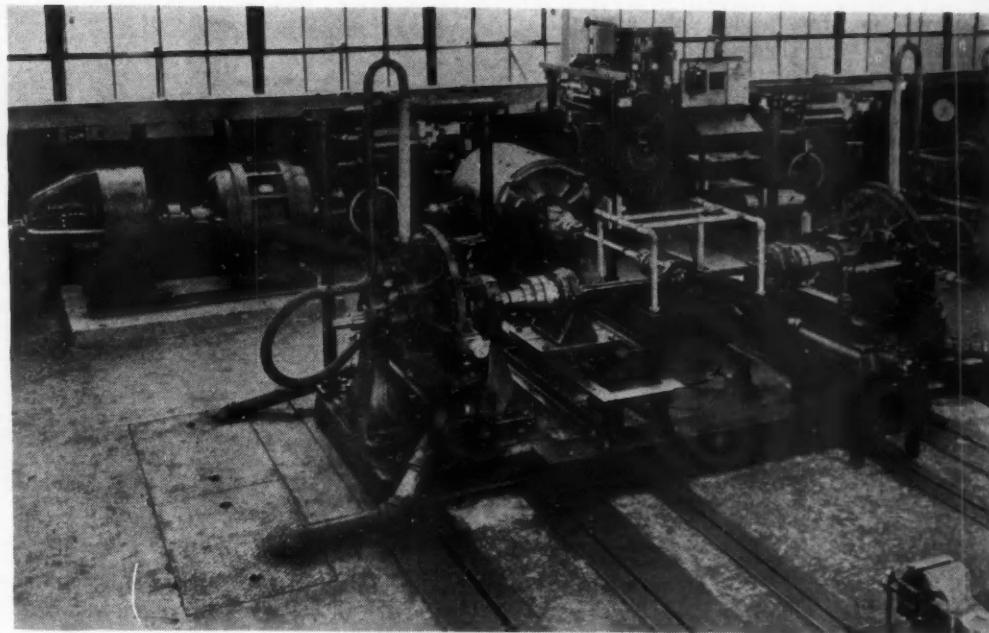


Fig. 4—Installation of electric and hydraulic dynamometers

## with Unique Equipment

propeller shafts, which makes the equipment useful for checking the oil flow characteristics of both truck and passenger-car axles.

In this unit the axles are loaded at the spring pads, which assures that the housing will deflect in the same way as in the field under service conditions. In the case of semi-floating axles, the load line is offset from the

bearings, as is the case in service, the load being applied through an anti-friction bearing mounted directly on the axle shaft. For full-floating axles an adapter is placed over the wheel bearings to receive the load. This applies the load exactly as in service, directly over the bearings. Knife edges at the load-center line of the mountings enable the axle housings to deflect

normally under load. Efficiency tests can be made in this machine by taking the torque reaction of the housing on a platform scale, as shown in the illustration.

Fig. 5 shows a bearing-testing machine which is thought to be the largest in the world. It was designed by Timken engineers to meet their special needs. In it single or double-row bearings up to 24 in. outside diameter can be tested for fatigue under both radial and thrust load. Radial loads up to 500,000 lb. and thrust loads up to 200,000 lb. may be applied to the bearings under test by means of hydraulic rams. Provision is made for filtering and cooling the lubricant. One pump circulates the oil through a cooler and delivers it to the housing, while a second pump draws the lubricant from the housing back to the oil tank beneath the machine. Provision is made for maintaining any desired oil level in the housing. A 75-hp. two-speed motor drives the bearings through a transmission capable of speed changes from 27 to 1000 r.p.m.

A torque device, installed between the transmission and the test spindle, indicates the power loss in driving the bearings. This device consists of a square-section helical spring with sleeves attached to each end. A 45-deg. slot is cut in one end of the spring, engaging with a pin in the sleeve, so that any circumferential movement between one end of the spring and the

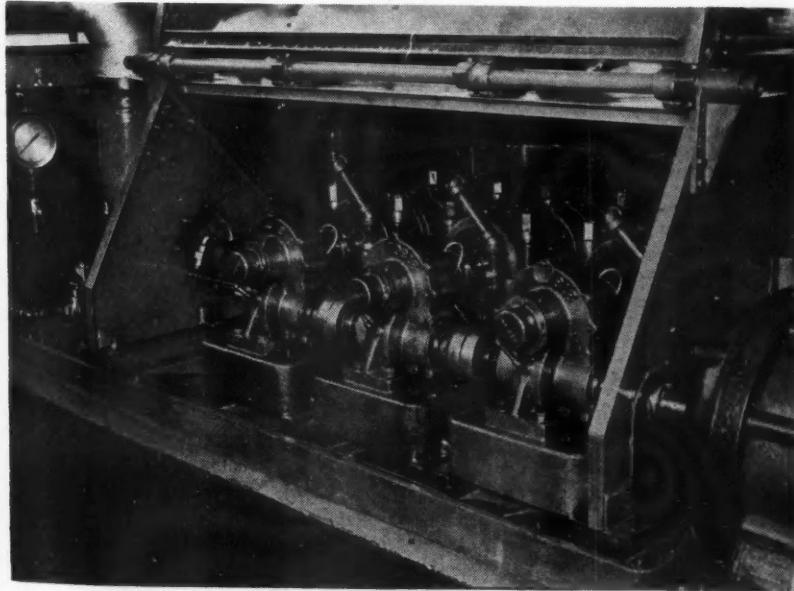


Fig. 3—View under housing of bearing-endurance testing machine

other will be transformed into axial movement of the sleeve. This movement is registered on the scale dial through a yoke and lever, the scale being calibrated in terms of lb.-in. of torque applied to the spring. As a constant temperature can be maintained by the circulating oil system in the bearings under test, any increase in torque indicates bearing failure.

Supplementing the 24 in. radial thrust machine is the 12-in. unit shown in Fig. 6. This machine, which has a capacity of 150,000 lb. radial and

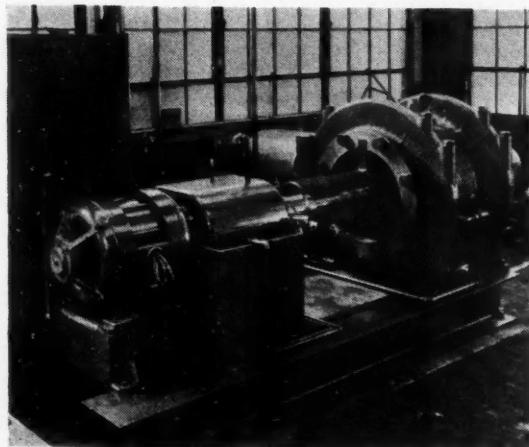


Fig. 5—Machine for testing large anti-friction bearings (up to 24 in. outside diameter)

thrust load, measures torque through a cradle on which both the driving motor and transmission are mounted. The lubricant is circulated through a cooling system beneath the machine.

The equipment shown in Fig. 7 is

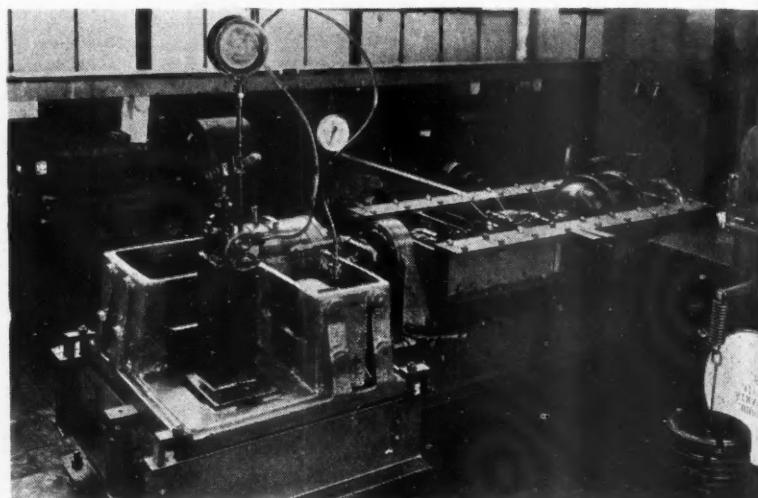


Fig. 6—Machine for testing bearings of up to 12 in. outside diameter for radial and thrust-load capacity

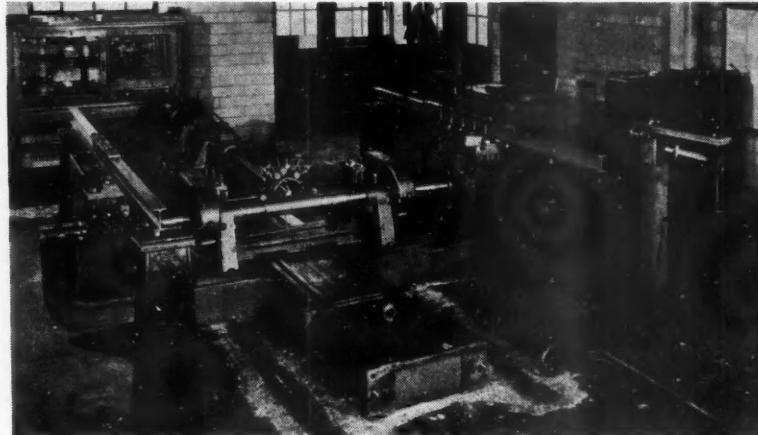


Fig. 7—Machine for testing automotive rear axles for deflection

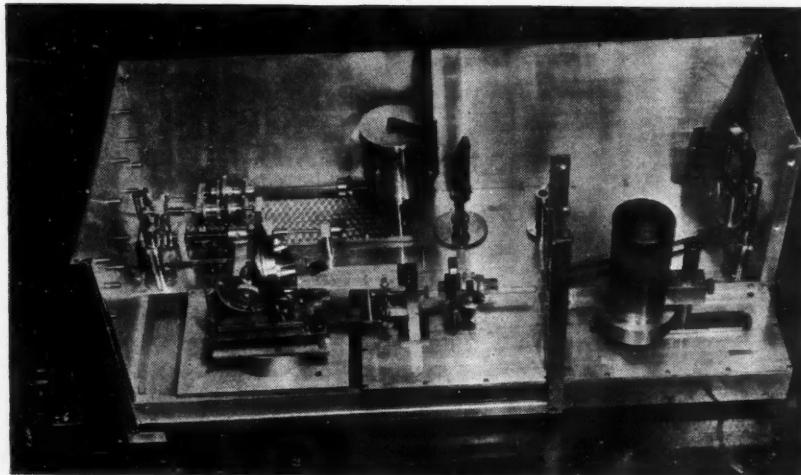


Fig. 8—Profilograph installed in air-conditioned room

used for testing the deflections of automotive rear axles. The axle under test is driven by a 20 hp. motor through two automotive transmissions. A speed of 12 r.p.m. is used for driving the pinion of the test axle. Torque is absorbed by two prony brakes which can absorb 20,000 lb.-ft., the maximum input torque being 2500 lb.-ft. Loads are taken through 14-in. pitch diameter gears on the axle drive shafts, platform scales of 1-ton capacity being used to measure the load at the end of 5-ft. beams.

Indicators are mounted on a ring bolted to the pinion barrel, and all deflections are relative to this point, measurements being taken of the carrier, ring gear, pinion, and bearing movements. Loads up to maximum

low-gear torque are used for deflection checks, and axles can be broken down to find the weakest part within the capacity of the machine.

Two profilographs of the type shown in Fig. 8 are installed in an air-conditioned room in the new Timken laboratory. The unit shown is capable of a vertical magnification of 5000, while the other is used for amplifications up to 2000. This equipment was originally developed for the Timken

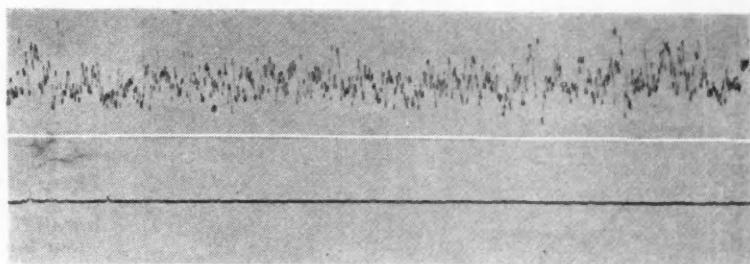


Fig. 9—Profilograph traces of good-commercially-ground and Timken mirror-finish specimens

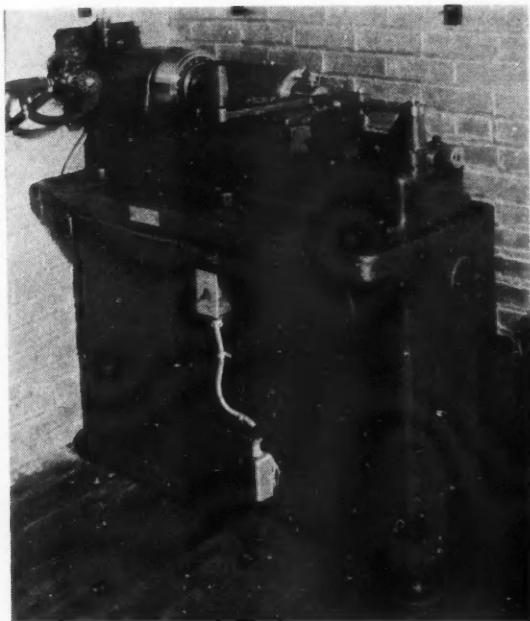


Fig. 10—(Left)  
Bearing-testing machine installed in sound-proofed room for quietness tests

company in the Research Laboratories of the University of Michigan and is used for checking surface finish.

A beam of light from a 108-watt projection lamp passes through a slit and lens to a small mirror mounted at an angle on one end of a bell-crank lever, the other end of the lever carrying a diamond point which rests on the specimen. The specimen is mounted on a platform having rectilinear mo-

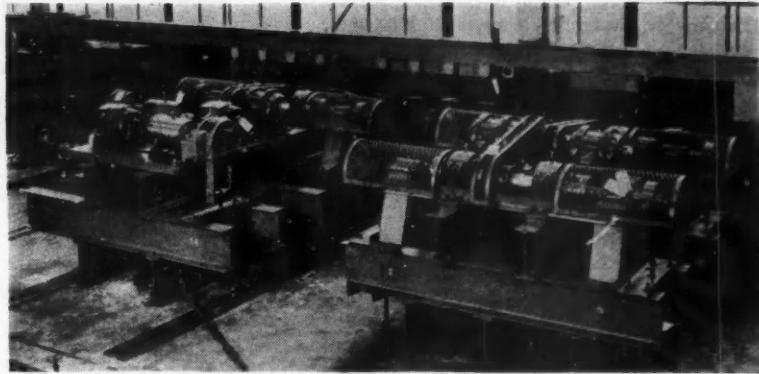


Fig. 11—(Above) Axle-fatigue-test installation

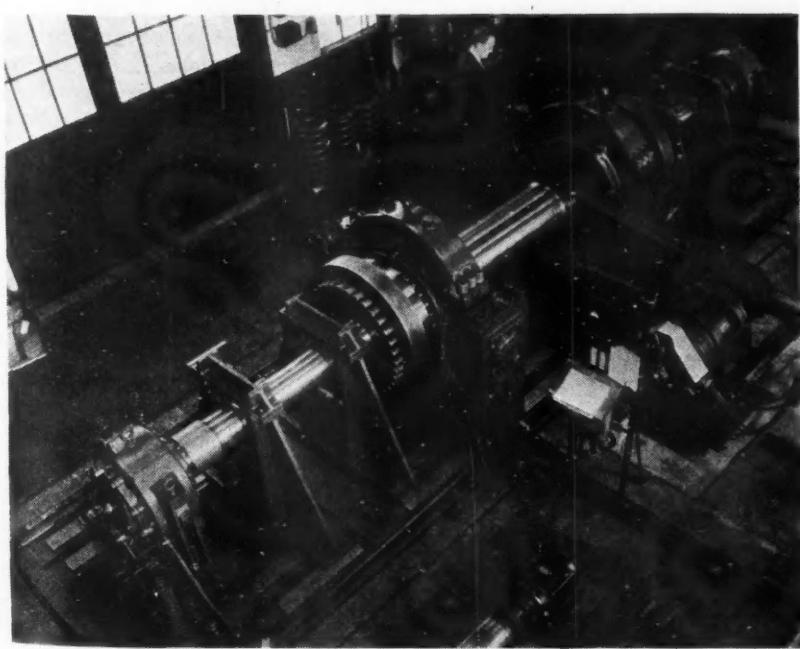


Fig. 12—(Below) Installation for testing locomotive-type roller bearings

tion, this platform being connected through gearing to the recording drum. From the small mirror the beam of light is reflected to a series of three other mirrors to increase the length of the light path, the beam being finally collected in a cylindrical lens and focused to a pin point on a sheet of sensitized paper mounted on the drum shown at the back of the panel.

Fig. 9 shows a profilograph print of 5000 magnification of a good commercial ground finish (upper) as compared to the mirror finish (lower) used on Timken bearings. The horizontal magnification is 30.

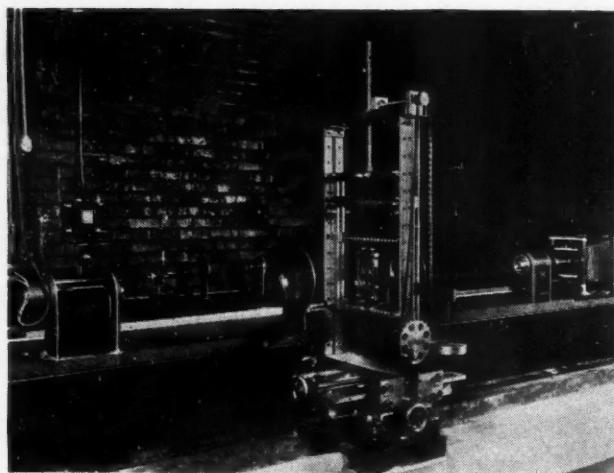


Fig. 13—(Left)  
Photo-elastic research equipment installed in Timken laboratory

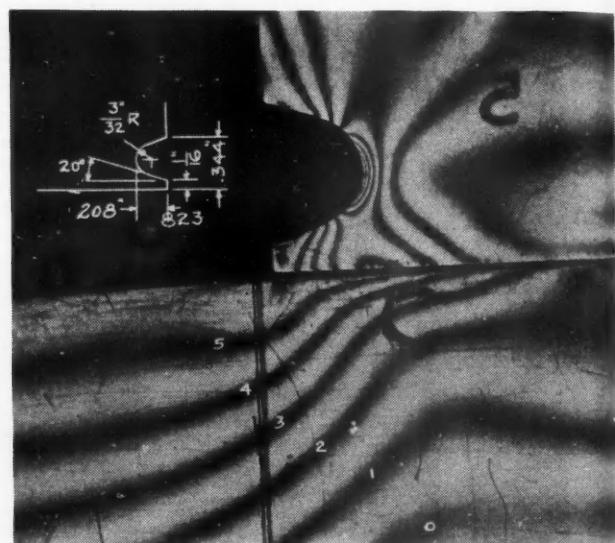
shapes which do not lend themselves, to the usual methods of stress analysis, have already been secured on this equipment, shown in Fig. 13. A typical fringe pattern showing the lower stress concentration in an axle due to the relief groove in the hub pressed on the axle is shown in Fig. 14.

Office, darkroom and drafting facilities, as well as sufficient machine tool equipment, are provided in this new laboratory, which is operated on a

To check the quietness of bearings, the machine shown in Fig. 10 was developed. This machine allows a bearing to be loaded with any pressure desired up to 1000 lb. and run in a sound-proofed room for testing. The machine is capable of running at constant speeds or being accelerated or decelerated as desired.

Axle fatigue tests are made on a battery of machines shown in Fig. 11, which are capable of handling axles up to 2 in. diameter. However, with the application of Timken bearings to locomotive driving axles operating at high speeds, it was thought desirable to secure basic data on full-size specimens. This required the design and construction of an entirely new piece of equipment, shown in Fig. 12. Two axle shafts, 8 ft. long and up to 14 in. in diameter, may be tested simultaneously in this machine, one being mounted at each end. A cantilever loading system is used, the load being applied by springs capable of 80,000 lb. load. Standard Timken railroad axle boxes are used on the load end of the shaft, while the wheel end is mounted in a central shaft. This shaft is also equipped with Timken steel-mill-

Fig. 14—(Right)  
Photo-elastic fringe pattern showing stress concentration in axle due to relief groove in pressed-on hub



type bearings. The main shaft is driven through an eight-strand V-belt by a 100 hp. variable-speed motor, the main shaft being designed to run at a maximum speed of 1100 r.p.m.

One of the largest and most complete set-ups for photoelastic research and testing in this country has been installed by the Timken company. Many valuable data as to stresses and their distribution in various design members, such as fillets, notches and other design

24-hour basis, most tests being continued to destruction. Chemical and metallurgical facilities are available in the Steel-and-Tube-Division laboratories of the company, which are used to supplement and amplify the work done in the physical testing laboratory. Much of the machine work in preparing specimens is done in the bearing plant tool room or experimental department, thus saving laboratory time and floor space.

## Let's Take a Step Forward in Engine Design

(Continued from page 499)

is too costly. But there are times in the life of every car manufacturing organization where it is necessary to take this step and it is the belief of the writer that we now stand on the threshold of the development of an entirely new type of engine, which, for a given output, will be smaller, lighter and more efficient than anything now avail-

able. There is beginning to be noticed a very marked swing in public taste away from speed and toward economy. A top speed of 75 miles-per-hour with good performance up to that speed and a marked gain in economy as a result of designing along these lines is apt to be far closer to public choice than a car with only fair economy, only fair

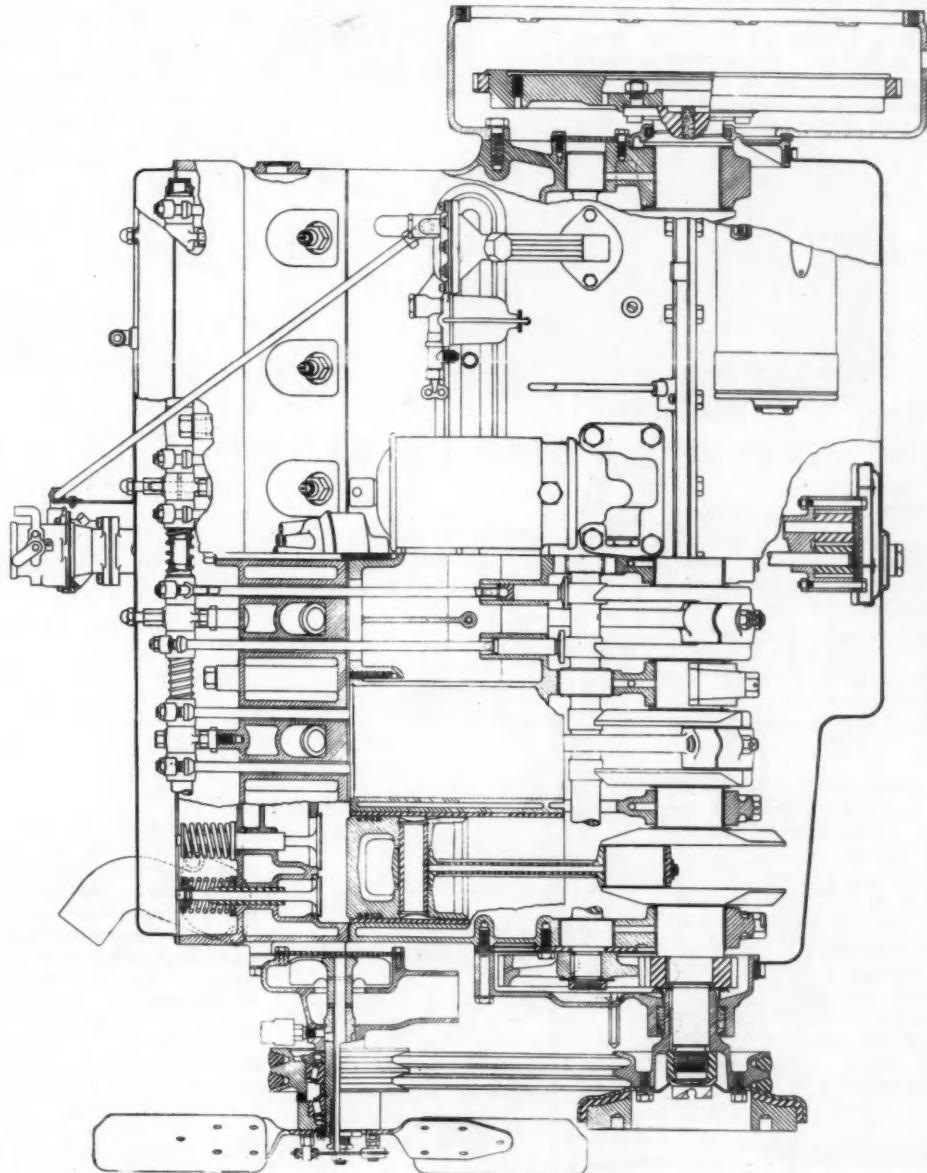
low-speed performance and a top speed between 90 and 100 miles per hour.

A clue to some of the possibilities along that line is furnished by the accompanying charts which show gains that have actually been made in our laboratory through the adaptation of these principles to existing engines insofar as it has been possible to do so.

# International Harvester Model FB Engine

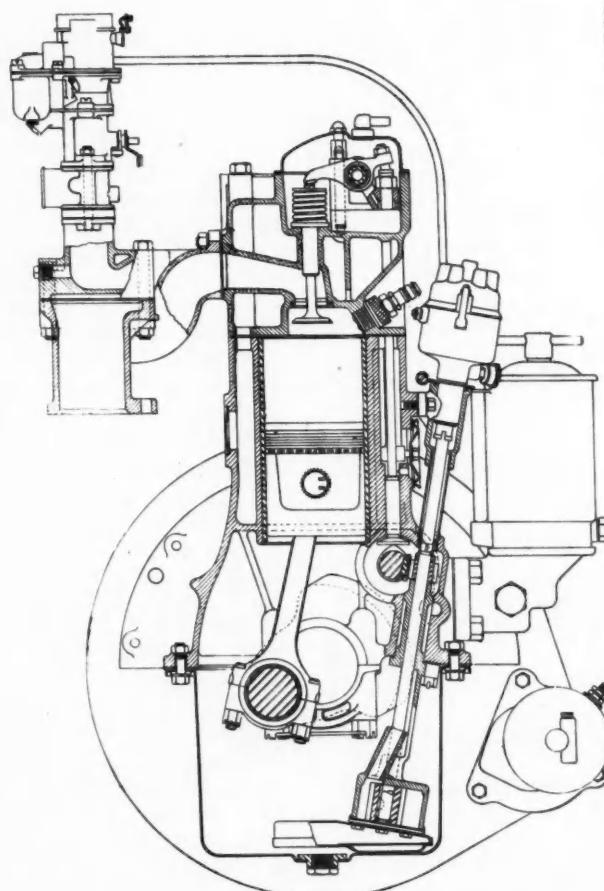
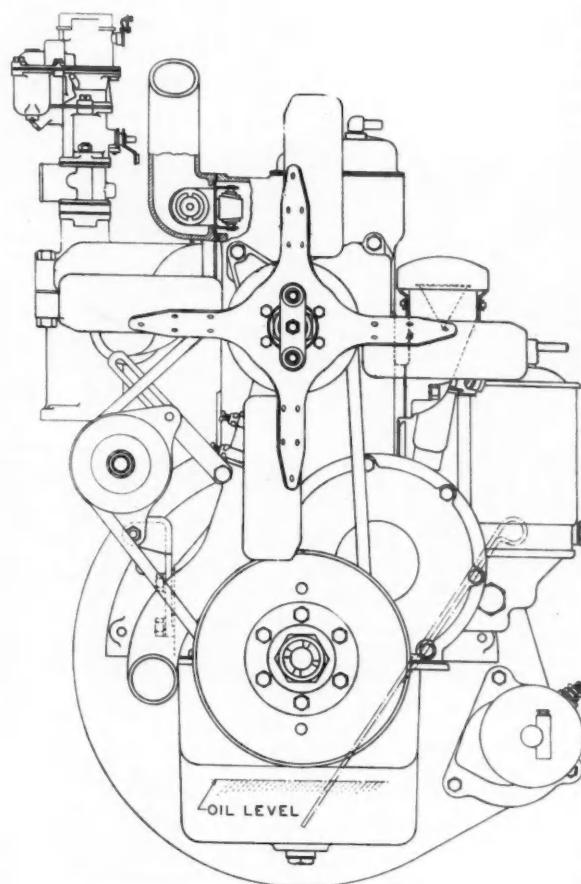
The drawings reproduced herewith show the features of the new heavy-duty truck engine line introduced by the International Harvester Co. some time ago. This series includes the IHC Model FB-361, six-cylinder valve-in-head, 4 1/8 in. bore by 4 1/2 in. stroke, 361 cu. in. displacement, 111.5 hp. at 2700 r.p.m.; Model FBB-401, 4 1/8 in. bore by 5 in. stroke, 401 cu. in. displacement, 114 hp. at 2600 r.p.m.; and FBB-450, 4 1/8 in. bore by 5 in. stroke, 450 cu. in. displacement, 115.5 hp. at 2400 r.p.m. The three engines have the same mounting dimensions. These engines have hardened, dry cylinder liners which are inserted after being shrunk in dry ice; hardened inserted exhaust-valve seats; and a front-mounted vibration damper, a new feature of IHC engines this year

No. 18 in the AUTOMOTIVE INDUSTRIES Series of Engineering Drawings



# International Harvester Model FB Engine

The new International engines are of the valve-in-head type, with valve operation by tappet rods extending through chambers formed in the cylinder casting. Water jackets extend all the way down the cylinders. Notice that a down-draft carburetor is employed and that the spark timing is under the control of the inlet vacuum. The



unusual depth of the cylinder-head casting is worth noting. The torsional vibration damper at the forward end of the crankshaft is of the rubber-hysteresis type. Water pump and radiator fan have a common belt drive, but the pump is not set into the engine block and its dimensions are therefore not restricted.

## Germany's "Popular" Car

(Continued from page 481)

and all statements as to the date of its appearance are mere conjecture.

Dr. Porsche, whom I interviewed at his office, maintained a reserved attitude, but appeared to be surprised at some of the statements which had been made in Germany regarding the date of appearance of the car and its selling price. He stated that the problem was a very difficult one and that the car could not be in the hands of the public by next January.

"We need production facilities," stated Dr. Porsche, "and although we have a good machine tool industry, it is not in a position to make immediate deliveries, and unfortunately it has not worked hand in hand with the automotive industry, as is the case in the United States. Our problem now is one of production. The car," continued Dr. Porsche, "is a full sized model, capable of carrying four big people. My reason for adopting an air cooled engine is to simplify garaging, for the car can be left in the open without danger of freezing." Both garages and service facilities are limited in Germany, not having kept pace with the recent growth of the industry.

Dr. Porsche would not make any definite statement regarding the price of the car, but intimated that it would be very difficult to get as low as 1000 marks, at the outset at any rate.

The man responsible for the design of the German "Volkswagen" was for 17 years chief engineer of the Austro Daimler Co. near Vienna. He spent five years with Mercedes and one year with Steyr. In 1930 Dr. Porsche became a consulting engineer and was responsible for the design of the Wanderer and other German cars. The work which gave him greatest prominence, however, was the design of the 16 cylinder rear engine Auto Union racing cars. For the last two years these cars have carried all before them. Dr. Porsche visited the United States last October, attending the Vanderbilt Cup race and afterwards visiting some of the automobile factories and prominent machine tool makers.

The official enthusiasm for the German popular car does not appear to be shared by all members of the industry. Several leaders in production and in merchandising gave it as their opinion that the car could not be produced for \$400; that it could not be in production inside two years, and that the nation was not ready to absorb a cheap car in the quantities generally spoken of.

W. G. Guthrie, production manager of the Opel Co., General Motors subsidiary, producing 450 cars per day, building the cheapest car at present on the German market, a four-cylinder sedan selling at 1450 marks, stated that production difficulties had been grossly under-estimated by the promoters of the "Volkswagen." Opel is the biggest automobile factory in Germany, employing 18,000 for passenger car production alone. In addition to the purchase price,

General Motors has invested 150,000,000 marks in the plant near Frankfort.

Mr. Guthrie gave it as his opinion that Germany was not in a position to produce this car in quantities and that it could not be sold at \$400. It is generally admitted that unless this price can be attained the car will be a failure, for it is intended that it shall reach a new strata of buyers and not come in competition with any existing models.

"The government of Germany has decided to favor the automobile industry," explained Mr. Guthrie, "and is giving it preference by placing it immediately after exports. In order to help the automobile industry government require-

ments are going to be reduced, this applying not only to the army and navy but to such state-owned departments as railroads. But existing contracts have to be carried through and it will be some time before the effects of this policy will be felt.

"Germany is handicapped by the shortage of raw materials. Production is constantly being held back because of lack of supplies: we may be held up for forgings, or if forgings are on hand, we are handicapped by lack of sheet steel. There is a general shortage of copper, brass, zinc, rubber, wool, which can only be paid for by exports—hence our efforts towards increased exports.

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Germany does not have access to the sources of supply which she needs, and there are no indications that England or any other country will be willing to hand over colonies without adequate compensation.

"We are having to find substitutes all along the line. Rubber has been produced synthetically, but costing 3½ to 4 times the price of natural rubber it is not a commercial proposition.

"Hitler's advisers appear to have overlooked the fact that 60 to 70 per cent of the production costs of a car are beyond the control of the automobile manufacturer. It is necessary to begin with the price of the raw material going

into the construction of the car. As an example of this, there is not a single continuous rolling mill in the whole of Germany. Machine tools cannot be supplied in less than two years."

Apparently the intention is to produce the "Volkswagen" in a number of specialized factories and to erect an assembly shop in the neighborhood of the body works. No details appear to have been worked out, and it is certain that there is no factory in Germany capable of producing motors, transmissions, frames or bodies without complete transformation and enlargement.

Distributors point out that the use of a popular car will be restricted so long

as operating costs remain at their present high level. Gasoline costs twice as much as in the United States; oil is scarce; all rubber has to be purchased abroad, or if synthetic rubber is imposed, costs will increase. Insurance is exceptionally high and the law is such that in case of accident the automobile owner is invariably condemned to pay. Garage charges are high and accommodation limited. The distributor system needs to be enlarged and service must be built up.

Not a few members of the German industry predict that the "Volkswagen" cannot be on the market before the end of 1939 and that even then it is doubtful if it can be sold for less than \$510, which will place it in practically the same class as some existing cars.



MECHANICS UNIVERSAL JOINT DIVISION  
Borg-Warner Corp. 1301 18th AVE., ROCKFORD, ILLINOIS

March 27, 1937

## Automotive Metal Markets

(Continued from page 483)

to cover at old prices. With price changes becoming immediately effective, the incentive that made the building up of backlog by mills possible, is largely removed. In its place, say the steel producers, has come anxiety on the part of consumers to have steel when they need it, the price incentive, therefore, having become superfluous.

In fact, a good many mills have on their order books a fairly heavy accumulation of business that has been placed to insure delivery on time and that will keep the mills going for many weeks. As usual, when such conditions develop, there is talk of a steel famine and of premiums for prompt shipment, but so far it is merely a case of pressure for deliveries in spots not at all justifying so extreme a market picture. With scrap iron prices now on a parity with those for pig iron, a movement to put an embargo on scrap exports got under way, but received little encouragement from the larger steel producers who fear any restraint on scrap exports might be extended to the heavy shipments of iron and steel products which they are now making to foreign countries.

**Pig Iron**—Automotive foundries are contracting for round tonnages of foundry and malleable for the second quarter after taking in all iron due them at first quarter prices. The market is firm and unchanged.

**Aluminum**—Secondary aluminum prices have been raised to the extent of ½ to ¾ cents a lb. Refiners are confronted with a sharp tightening of the supply of suitable scrap. The best grade of No. 12 secondary alloy is now quoted at 20 cents, with the other grades ranging in price from 18½ to 19½ cents.

**Copper**—Speculators, both here and abroad, are unloading. Export prices have dipped very close to the domestic price, producers continuing to quote electrolytic at 16½ cents. Buyers at that level are difficult to find. Ingot makers have revised their prices downwards.

**Tin**—Wide price fluctuations continue to keep those in the tin market on tenterhooks. Spot Straits tin was offered at the beginning of the week at 62 cents, compared with 64½ cents at the preceding week's close. On Tuesday the market recovered the lost ground, closing again at 64½ cents, with the tone a shade steadier.

**Zinc**—Tumbling prices in London affected the tone of the zinc market rather than quotations, which had not been raised during the erratic upturns abroad.

Automotive Industries

## Production Tops Last Year

(Continued from page 479)

March production was not interfered with seriously by the layoff. The company is now turning out 440 units a day.

The Studebaker Corp. sold 2798 cars and trucks in the first 10 days of March compared with 2206 in the corresponding period of 1936. This brings sales for the year to date to 18,502—an increase of 28 per cent over last year.

Retail sales of Hudsons and Terraplanes are at their highest level in seven years and dealers are well stocked to permit of a continuation of this pace through the spring selling season. Total sales for last month were 9726 cars, which not only broke a seven-year record, but surpassed the volume for the corresponding month of last year by approximately 60 per cent.

## Trailer Industry Survey

Begun by Census Bureau

The Bureau of the Census is preparing for the first survey of the rapidly growing trailer industry. It will start a mail canvass within a few days through schedules to be sent to trailer manufacturers covering factory sales of house trailers and semi-trailers, truck trailers and semi-trailers and other types of passenger car trailers for the calendar year 1936. The number of sales will be recorded together with the net wholesale (f. o. b. factory) value based on prices charged to dealers, distributors and branch agencies.

The Bureau of the Census has asked that it be communicated with by manufacturers failing to receive schedules.

"The timeliness of the report will depend largely upon the promptness with which manufacturers return their schedules," the Bureau pointed out. "The best interests of the industry as a whole will be served by early publication of the report."

The Bureau was unable to indicate how soon the returns may be completed and the report made available.

## Chevrolet Again Sponsors

Soap Box Derby at Akron

For the fourth consecutive year, Chevrolet will again cooperate with the leading newspapers of the country in sponsoring the All-American Soap Box Derby, recognized by sports writers and enthusiasts as "the greatest amateur racing event in the world."

The derby, started in Dayton, Ohio, four years ago, has grown in popularity and appeal so that today it stands alone as the greatest single sporting event for boys. Thousands already are making plans for building their own racers for this year's event.

Last year there were more than 150,000 boys competing in various cities throughout the U. S. Champions from 116 cities took part in the national finals at Akron, Ohio.

The national and international finals this year will be held at Akron on Aug. 15, according to an announcement made this week by C. P. Fisken, advertising manager of Chevrolet. City champions from 120 cities will compete. Entries from Canada, South Africa, Mexico and Hawaii are also expected to compete in the international finals. Plans already are under way for enlarging the facilities of the concrete track at Derby Downs, just outside the Akron airport.

## Canadian Output Rises, Exports Slightly Lower

During the month of February production of automobiles in Canada amounted to 19,707 units as compared with 19,583 in the previous month and 13,268 in February, 1936. The month's output included 14,415 passenger cars and 5292 trucks, of which 10,667 passenger cars and 2872 trucks were made for sale in Canada, with the balance for export. Customs figures show that 1387 cars were imported and 4436 exported during the month; a year ago 356 were imported and 4583 exported.



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## Japan's Car Output

**Last Year's Reached 9632, Almost Double That of '35**

Japan proper, Korea, Formosa, the Kwantung Leased Territory, the South Manchuria Railway zone, Japanese Saghalien and the Mandated South Sea Islands at the end of October, 1936, had a total of 149,635 automobiles. This figure included 89,008 passenger cars, 56,082 motor trucks and 4545 other cars. Compared with the United States which has one motor car for five persons, Japan has a ratio of 665 for each car.

Last year's domestic car output is

reported as 9632 units, an increase of 4277 over the preceding year, which in turn recorded three times the output of 1934. The rapid growth of production is mainly accounted for by home-produced midget-cars of the "Datsun" type as well as trucks, while the output of standard passenger cars was still negligible.

The automobile industry was given prominence in the plenary session of the House of Peers last month in connection with the question of industrial control when it was stated that the automobile industry, as well as the fuel industry, must aim at quantity production from the standpoint of national defense.

### New Small Car

A new midget-car named "Kokueki" has been announced by the Kokueki Automobile Works. The tiny vehicle sells for 1650 yen. Kokueki tricycle trucks powered with 4-cylinder engines of 45.75 cu. in. displacement will go on sale in April. The company is also experimenting with small Diesel cars at its Sakai factory.

### New Models for Army

Besides concentrating on the production of small "Daihatsu" cars, the Hatusuki Co., of Kobe, has drawn up plans for the production of medium-sized passenger cars to be powered with 1.9 liter (116 cu. in.) air-cooled engines. At the outset, the firm will sell the new models to the defense services and public sales will begin only after production costs have been lowered sufficiently.

## Canadian Car Prices

### Upward Adjustments Cover Equipment and Delivery Charges

While general price increases on a number of makes of automobiles in Canada are believed imminent due to rising costs of materials and production, minor upward adjustments in prices made recently by some companies are attributed to additional equipment and accessories or to unabsorbed items of dealers' selling costs.

For the most part, the effective advances are fractional in relation to the prices involved. They range from \$10 to \$35 in amount, and average 1.5 per cent of retail values. In only one instance, Studebaker, was it suggested that the price rise was a straight advance due to increased production costs, but it is believed that adjustments in regard to equipment carried also contributed to the change. The increases range from \$15 to \$21 on Studebaker's "Dictator" line and from \$20 to \$35 on the "President" line. Upward price differences ranging from \$15 to \$25 on Packard's medium model and the two higher-priced lines are declared due to additions to standard models of equipment and accessories formerly sold as extra items.

Recent advances in retail prices of General Motors of Canada, Ltd., cars were not due to increases in the list prices set by the factory and distributing units of the company, it is learned, but to inclusion of dealers' handling charges in the retail prices. The current advances on General Motors cars to make provision for dealer handling charges average \$25 on lower-priced McLaughlin-Buick models; \$18 to \$20 on Pontiac (all models); \$11 on Chevrolet, plus \$4 for added volt control mechanism; \$15 on Oldsmobile (all models). No increases have been applied to Cadillac or LaSalle models, but some adjustment may be made later. Price advances a month ago on Nash lines amounted to \$8 on Lafayette models and \$12 on regular Nash models and covered additional equipment.

### High Cycle

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